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COMPUTERWORLD

War's high-tech legacy

BY MITCH BETTS
CW STAFF

Among the many technology heroes of the Persian Gulf war were the U.S. Air Force computers that churned out the 300-page Air Tasking Order each day at allied headquarters in Saudi Arabia. The computers processed a myriad of details to orchestrate the most intricate and successful air war in history.

But U.S. Navy pilots were not in the electronic loop.

Earlier this month, the Pentagon acknowledged in a preliminary report on the war that because of a lack of interoperability between Air Force and Navy computers and an insufficient communications link, Navy aircraft carriers got their copy of the Air Tasking Order in the form of a floppy disk delivered each night by helicopter.

Similar disclosures about incompatible computer systems and other technical glitches are beginning to tarnish the once-glowing reports about the role of technology in the war, which was triggered by Iraq's invasion of Kuwait nearly a year ago.

Continued on page 86

Back stateside *after the longest Gulf deployment by an Army Reserve team, the soldiers of the 324th Data Processing unit continue their operational mission while tensions still simmer in the Middle East. Story, page 86.*

Unisys hacks products, jobs

BY ELLIS BOOKER
CW STAFF

BLUE BELL, Pa. — For months, Unisys Corp. protested that its future was not as bleak as analysts projected. Last week, however, it forecast a grim future for 10,000 employees who will lose their jobs and uncertainty for customers of product lines that will be "de-emphasized."

Unisys said it is setting aside $1.2 billion, of which $925 million has been earmarked to pay for its restructuring task. On top of a $100.2 million operational loss in the second quarter, the company's loss for the quarter totaled $1.3 billion.

Meanwhile, Unisys plans to focus its new business efforts on four markets: financial services, airlines, communications and the public sector.

As for its product lines, Unisys will phase out its V series mainframes and System 80 minicomputers and is considering outsourcing production of its Unix-based U 6000 series.

"I am confident the dramatic actions we are taking now will produce a profitability breakthrough," said Unisys Chairman and Chief Executive Officer James A. Unruh in a prepared statement. Unisys has reported losses in six of eight quarters.

For a year and a half, customers of the troubled No. 3 U.S. computer company have watched ominous financial reports coming from their vendor; they have already weathered two waves of staff cutbacks (see story page 8).

But users and analysts appeared split last week, with some in each camp expressing concern that the latest round of cuts would erode field support and research and development. Others

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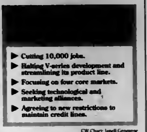

- ▶ Cutting 10,000 jobs.
- ▶ Halting V-series development and streamlining its product line.
- ▶ Focusing on four core markets.
- ▶ Seeking technological and marketing alliances.
- ▶ Agreeing to new restrictions to maintain credit lines.

CW Chart: Janell Genovese

DEC to cut despite growth

BY MARYFRAN JOHNSON
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. sailed against the industry tide last week with a 17% increase in total operating revenue for the quarter just ended. But the company set aside $1.1 billion to pare down its work force and finance other cutbacks.

That paring began last week with the announcement that 2,000 employees would be laid off at DEC facilities worldwide in the first installment of an anticipated 16,000-job cut by 1993.

The $1.1 billion set-aside brought DEC into the red for the quarter, but even that did not keep analysts from reacting positively to DEC's announcements. The change also resulted in a net loss of $617.4 million for fiscal 1991.

In contrast to figures from many large-systems vendors who have watched sales erode, DEC's revenue was up by almost $580 million in the quarter, thanks mainly to flourishing sales of workstations, VAX 4000 client/server systems and services in its burgeoning personal computer integration business.

The $1.1 billion restructuring charge will cover the next two years. That figure earmarks $550 million for costs associated with layoffs during fiscal 1992 and 1993 and $550 million for reductions in property, plants

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European allure

▶ DEC buying Philips' computer division in bid for market clout. Page 88.

LANs victim of OS/2 split

BY PATRICIA KEEFE
and JIM NASH
CW STAFF

The widening schism between Microsoft Corp. and estranged partner IBM has extended to LAN Manager, with Microsoft now focusing its efforts on producing a Windows version of LAN Manager rather than resolving interface differences between its server and IBM's OS/2 LAN Server.

In short, users who have already waited close to two years for the promised convergence of the two related server systems can hang it up, said Steve Ballmer, Microsoft's senior vice president of systems software.

Continued on page 6

Some jobs you can't bank on anymore

BY CLINTON WILDER
CW STAFF

Last week's announced merger of NCNB Corp. and C&S/Sovran Corp. put Jack Trussell back in a familiar position. For the third time during his 13-year career in banking information systems, Trussell, a strategic information planner at C&S/Sovran in Atlanta, is wondering about his post-merger future.

Across the U.S., IS professionals in the banking industry can empathize with Trussell. The combination of banking deregulation and financial woes has resulted in unprecedented consolidation, forcing a lean-and-mean philosophy onto virtually every major financial institution. Banks, once considered an abundant source of IS jobs because of their automated transaction needs and information-based products, are thinning their IS ranks as never before.

Last week, NCNB and C&S/Sovran announced their $4.26 billion merger intentions and immediately announced plans to eliminate 9,000 jobs during the next three years. That news came one week after the Chemical Banking Corp./Manufacturers Hanover Corp. merger announcement and its resulting loss of an estimated 6,200 jobs [CW, July 22].

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INSIDE

Andy Freeberg

Varian Chairman J. Tracy O'Rourke doubts whether the current generation of IS executives can speak the business language. See The CEO View, page 53.

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89 The IBM RISC System/6000 gets spiffed up with enhanced color capacity and an added visualization system.

Quotable

"The most 'European' companies in Europe right now are American."

MARTYN ROETTER
ARTHUR D. LITTLE

On the pressures European vendors face in market unification. See story page 88.

SYSTEMS & SOFTWARE

25 IBM's mainframe code generator, CSP, is going strong, with lots of attention from developers, but response from users has generally been weak.

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45 German megafirm BASF envisions global information flow. Its newly adopted RPC tools help put that end in sight.

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The 5th Wave

RICH TENNANT

"HOW'S THAT FOR FAST SCROLLING?"

EXECUTIVE BRIEFING

■ **Industry giants DEC and Unisys** told different financial tales last week, but both share the bleak task of restructuring operations to respond to a changing industry. Unisys, which reported a quarterly loss of $1.3 billion, will cut 10,000 employees and is planning to "de-emphasize" some hardware product lines. DEC fared far better in the numbers game, reporting a 17% increase in operating revenue, but it, too, is forced to make cutbacks; Up to 16,000 employees will be let go over the next two years. **Page 1.**

■ **IS architectures are a must** for companies that want a stable framework within which development, implementation and planning activities can occur. Having such a blueprint makes economic sense because it helps companies avoid the costs of launching the wrong projects or building applications that won't integrate. **Page 67.**

■ **DEC's proposed acquisition of Philips Electronics' computer division** could not only expand its customer base but also add to its share in the Unix marketplace, a key strategy for the Maynard, Mass.-based company. **Page 88**

■ **Artificial intelligence is slowly going mainstream** in many Fortune 500 companies. The silent flowering of AI is good news for hard-pressed AI vendors and promises a more active role for IS managers. **Page 59.**

■ **Banking mergers and consolidations** are changing the face of IS in that industry. The banking industry, which once provided a wealth of IS jobs because of its automation needs, is becoming a limited field for IS professionals. **Page 1.**

■ **IBM's Cross System Product** is high on user acquisition lists but is still not widely respected. IBM responds with promises of more enhancements. **Page 25.**

■ **Bob Berland, an IBM** executive and highly regarded software industry figure, died last week after a battle with cancer. **Page 6.**

■ **The Persian Gulf war was the most high-tech** combat effort ever, but a recent Pentagon report says the more basic IS services behind the dazzling front-line technology were sometimes insufficient. For instance, because of limited interoperability between the Air Force and Navy systems, some information was delivered nightly via floppy disk instead of by direct transmission. **Page 1.**

■ **IBM and CA will push individual data access approaches,** while the SQL Access Group tries to establish an access standard. The three efforts work from the same specifications but could cause some short-term confusion. **Page 10.**

■ **Wang users check out their options** now that their vendor has teamed up with IBM. Lower end VS users have time on their side and can upgrade to higher end models. But the high-end VS customers may soon have to make the decision to migrate to IBM AS/400s. **Page 8.**

■ **Pen-based computing** is the focus of more industry predictions that say it will become the next industry phenomenon. **Page 37.**

■ **James Cannavino, IBM's desktop chief,** insists the PC market is a far cry from a commodities war. He says IBM can still compete at both the high and low ends of the market by capitalizing on value-added services such as multimedia offerings. **Page 33.**

■ **On site this week:** A lightning bolt that blasted customer data was the zap needed to help the Owner-Operator Independent Drivers Association decide on an IBM AS/400 to replace a slow-running LAN-based system. **Page 29.** The Christian Science Publishing Society focuses on network management to better handle its burgeoning media business. **Page 49.**

Efficient data sorting translates into bottom line benefits at MCI

Optimizing applications performance is critical in today's highly competitive business environment. In the telecommunications industry, where huge databases are involved, even small percentage increases in processing efficiency can translate into enormous bottom line benefits. That's why MCI Telecommunications established a Computer Performance Management department.

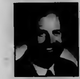
Bob Gray, Senior Manager of that department, explains, "We like to become involved in the earliest phases of the applications development cycle rather than tweaking for performance after an application is already developed. That way, we can complete optimized business critical applications faster."

To achieve improved processing efficiencies, Gray identified operations which could be streamlined without negatively impacting existing operations. "We wanted to focus our optimization activities on the elemental or base constructs of any computer program or process," he says. "But at the same time, our goal was to identify efficiencies we could implement without disrupting day to day processes. Together, these criteria led us directly to careful evaluation of the sorting process.

"Virtually all applications require some form of data ordering," Gray continues, "and we were already using a sort product. What we needed to do was to optimize the use of that sort system since it represented a cornerstone function in so many applications."

The importance of sorting to MCI is brought home by the fact that as many as 165 million records can be required for processing any single application. "When sorting 20-30 gigabytes of data," Gray says, "efficiency is critically important." Sorting is so prevalent a function at MCI that as many as 30 different sorts may be running concurrently on their multiple IBM 3090 systems.

Industry studies indicate that the cumulative resource consumption of sort operations can approach 30% of the CPU, 30% of all DASD I/O, and 70% of temporary DASD space. It was this recognition of the importance of sorting to overall operations that motivated MCI to install SyncSort OS, a high performance sort, merge, and copy utility from Syncsort Inc., Woodcliff Lake, New Jersey. Benchmark tests cited by Syncsort Inc. have shown that the product yields savings of 30% task CPU time, 80% supervisor CPU time, and 70% I/Os compared to other sort systems. Further, Gray comments that Syncsort has been "very responsive" in helping MCI address their large sorting needs.



BOB GRAY
Senior Manager of
Computer Performance Management
at MCI

"Our job," Gray says, "was to optimize SyncSort utilization to boost overall performance efficiency, as well as to identify new ways to benefit from the product's rich feature set which extended its application beyond conventional sorting activities." One notable SyncSort benefit which Gray encourages people to use is a utility called SortWriter. SortWriter allows users to quickly create large volume, list-oriented reports by simply specifying a few simple control statements.

Gray began enhancing SyncSort utilization by identifying particular jobs where features of the product could be used to maximize application efficiency. "For example, if there are 10 people who want to use subsets of our entire database of traffic data," Gray explains, "all 10 end-users can either read all of the records in the database and then sort that universe individually, or they can all be given access to the pre-summarized sub-set of data required. The second option is far more efficient because the original huge mass of data is only sorted once. As a result, end-users can get their data almost two days sooner than if 10 large separate sorts were done."

Completing sorts faster allows end-users to reach the desired result of the applications faster, and thereby gain the time value of money. "If, for example, we're able to generate bills one day sooner because of a faster sort process," Gray explains, "those bills will be paid one day sooner as well. In terms of cash management and interest paid on our cash balances, this could be a tidy sum."

Kathy Skrastins, a member of Gray's group, used a technique she learned at a SyncSort Power Applications Workshop to revise a job that "saves resources every time we run it now." Before this revision, Skrastins says, the job read two tapes to pull out one telephone number. "Now we use the multiple conditions on the include statement we learned about in the Workshop to pull out as many as ten phone numbers in each job. We save up to nine jobs and twice that many tape mounts."

Another benefit of more efficient sorts is that they free host resources for other purposes, thereby reducing the need to expand resources to meet increasing processing requirements.

"Since we already own our hosts, using our resources less of a day does not change the dollar value it costs to own the machine for that day," Gray explains. "But lower resource utilization for a given process enables us to redirect resources to other tasks that we would not have otherwise been able to do in that same time window. So another real economic value of resource-efficient sorts is that by enabling us to maximize existing systems we can defer the cost of acquiring additional resources."

Overall, Gray expects to improve operational efficiency through sorting by as much as 25%—depending on the specific application. "We've found that sorting is one of the basic underlying processes in virtually all of our applications," he says. "Optimizing SyncSort utilization at MCI is enabling us to meet our performance objectives, which in turn help us maintain our leadership position in the highly competitive inter-exchange market."

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Compaq becomes latest PC giant to falter

BY MICHAEL FITZGERALD
CW STAFF

As expected, Compaq Computer Corp. rounded out a dismal quarter for the three biggest personal computer makers when it posted its first-ever quarterly drop in sales and barely eked out a profit for its second quarter.

Compaq's bad news followed IBM's report of a small profit and Apple Computer, Inc.'s loss. Some PC companies remain strong, though — Microsoft Corp. and AST Research, Inc. reported record profits.

Compaq posted a $20 million profit on $718 million in sales, down from a $104 million profit in the second quarter of 1990 on $862 million in sales, the first such decline in Compaq's history, according to Eric Zimits, an analyst at Rauscher Pierce Refsnes, Inc. in Dallas. Net income for the first six months was $135 million, down from $196 million in 1990.

Joseph "Rod" Canion, Compaq's president and chief executive officer, said in a statement that Compaq suffered hits in both the European and U.S. markets because of recessionary and pricing pressures and U.S. dealer consolidation. (Analysts said Compaq lost market share in North America, although Eckhard Pfeiffer, Compaq's chief operating officer, denied this in an interview with *Computerworld*.) Eight of Compaq's 10 largest dealers merged in the first half of the year.

Analysts said Canion told them he would not rule out the possibility that Compaq might lose money in the third quarter if the recession continues and European sales suffer their "typical seasonal softness." Pfeiffer said Compaq is "healthy, and [we] have taken many steps, which had to be taken."

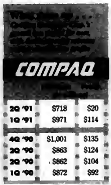
Most analysts said they felt Compaq would avoid a loss.

"I think they probably won't lose money," Zimits said. He added that he thought Compaq would see sales increase because of its price cuts and dust settling in the dealer channel.

George Thompson, a PC analyst at Datapro Information Services Group in Delran, N.J., agreed, "Compaq's still pretty small, and they can bounce back quickly. This is just one quarter, and they're not sitting still — they've made one or two mistakes, and they're correcting them."

However, Joseph McGlone, president of investment research firm McGlone and Associates in Westport, Conn., did not agree that the worst was behind Compaq.

"These guys [Compaq] have the wrong mentality. The reasons why AST had a good quarter are the same reasons why Compaq had a bad quarter — Compaq does not have a good 486 lineup and AST does, and its prices are still too high."



2Q '91	$718	$20
1Q '91	$971	$114
4Q '90	$1,001	$135
3Q '90	$863	$124
2Q '90	$862	$104
1Q '90	$872	$92

CW Chart: Doreen St. John

McGlone added that as long as Compaq tries to maintain higher gross margins than companies such as AST and Dell Computer Corp., it will have difficulty competing against them.

Meanwhile, Irvine, Calif.-based Compaq rival AST posted record sales and profits, both for the fourth quarter 1991 and for its 1991 fiscal year ended June 28. AST made $64.7 million on sales of $689 million, up 46% over 1990 profits of $35.1 million on $534 million in sales.

AST credited its jump in sales and earnings to strong sales of its Intel Corp. 80386SX-based notebook and an increase in sales of I486-based machines.

Microsoft benefited from strong sales of Windows 3.0 and the release of DOS 5.0 and saw profits rise 65.7% on a 55.8% increase in sales for 1991.

The Redmond, Wash.-based company made $462.7 million on sales of $1.8 billion in fiscal year 1991.

Judge lifts sales ban on Baby Bells

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — A federal judge last week lifted the restriction that bars the regional Bell telephone companies from selling electronic information services. The ruling paves the way for the seven companies to introduce an array of new services for businesses and consumers, including two-way interactive video, electronic publishing and home shopping.

However, those services may not be available from the Bell companies soon. U.S. District Judge Harold H. Greene, who oversees the consent decree that broke up AT&T and who reluctantly lifted the ban last week, stayed his order, pending review by an appeals court.

The Baby Bells hailed the decision, saying increased competition in information services will lead to new customer choices and lower prices. "Consumers and small businesses are the real winners today," said Edward E. Whitacre, chairman and chief executive officer of Southwestern Bell Corp. "Now Americans can look forward to the same kinds of services widely available in France, Japan and other countries."

Difference of opinion

Others disagreed. "We are obviously disappointed. We're surprised Judge Greene couldn't find a way to maintain the restriction," said Ken Allen, senior vice president of the Information Industry Association. "In the long run, it will mean users will have fewer services at higher prices. Information services is an entrepreneurial industry, and the entrepreneurs will be crowded out. There will be these 600-pound gorillas in the china shop."

Greene shared that view in his 70-page ruling, saying it would most likely result in the concentration of information services in the hands of just a few dominant suppliers. But Greene said he felt an appeals court decision last year that directed him to reconsider the ban left him no choice but to roll it back.

The publishing industry also strongly opposed lifting the information services ban, fearing increased electronic competition will lead to a further decline in the consumption of books, magazines and newspapers.

Ameritech lamented the delay implicit in Greene's stay and called for lifting the consent decree terms that bar the Baby Bells from manufacturing and long-distance services.

CORRECTIONS

Due to a production error, a stock table from the April 22, 1991 issue was inadvertently published last week instead of the usual Friday Stock Ticker.

* * *

A story on page 79 of the July 22 *Computerworld* incorrectly described Hopkinton, Mass.-based Clearpoint Research Corp. as having recently settled out of court with IBM on charges similar to those brought against Comdisco, Inc. The company that in fact did so is Hopkinton, Mass.-based Cambex Corp. Clearpoint, which, as indicated in the item, did acquire control of Distributed Logic Corp., has never been sued by IBM.

HP encourages some workers to quit jobs

BY J. A. SAVAGE
CW STAFF

PALO ALTO, Calif. — While many computer firms known for policies of no layoffs are reversing those policies, Hewlett-Packard Co. is trying to reduce its work force by offering carrots rather than throwing sticks.

Early retirement programs and severance packages in effect during the past year at HP have reduced the company's work force by 780 employees, but HP, which employs approximately 91,500 people worldwide, said there is still some trimming to be done — potentially more than 2,000 employees.

"There's some enhanced productivity, which allows for the layoffs, and then there's the current market conditions," said Michele Drake, manager of personnel communications at HP.

There is also a shifting of emphasis in some geographical areas. For example, the sales force in Colorado, which handles non-reduced instruction set computing workstations, will not be affected, but sales forces in other areas will be.

HP is limiting its voluntary severance to certain geographical areas, although all employees who are eligible for early retirement may take that package, which includes half a month's pay for each year of employment up to one year's pay.

Drake did not break down the number of employees targeted by computer operations vs. HP's test and measurement operations, but she did say test and measurement was "growing slower" than the company's computer side.

Finally, HP is forcing workers to take paid holiday time during Christmas week. The mandatory vacation should result in savings of more than $2 million, according to HP.

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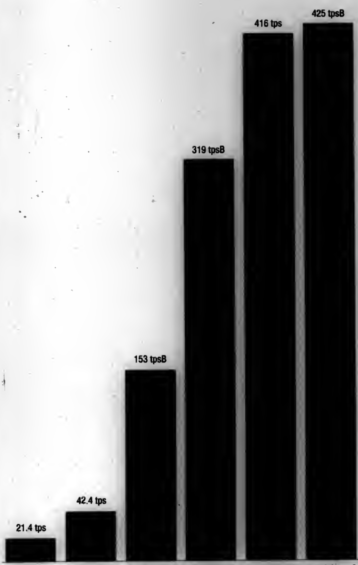

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NEWS SHORTS

IBM protests AT&T contract award

IBM's Federal Sector Division filed a protest last week against the U.S. Department of the Treasury's award of a $1.4 billion office automation contract to AT&T. IBM claimed AT&T's winning bid for the Treasury Multiuser Acquisition Contract was half a billion dollars above IBM's bid. Going with the higher bid was unjustified, given the department's tight budget and the fact that IBM's proposal more than exceeded the Treasury's technical requirements, IBM claimed. The vendor also said in its filing that the Treasury's criteria for awarding the contract were inconsistent with those outlined in the original request for proposals. In a prepared response, AT&T said it plans to intervene in support of the Treasury in this protest.

……

Unix security challenge offered

Offering up a high-technology road test for the enhanced security features in Unix System V Release 4.1, Unix Systems Laboratories, Inc. (USL) last week challenged selected computer systems vendors and major corporations to take a shot at breaching operating system security via dial-up access to an AT&T 3B2 computer. The enhanced version provides enterprise security features, such as secure file protection and validation of authorized users, that are required to support Unix International, Inc.'s "Corporate Hub" environment. The USL offer will initially be restricted to certain beta-test site vendors and users, but all Unix System V Release 4 source code customers will get a chance to assail the new Unix version.

……

Borland invites Windows migration

Hoping to trigger migration to its forthcoming Microsoft Corp. Windows environments, Borland International, Inc. is issuing passports. Its new incentive program, called Passport, offers discount upgrades to the upcoming Windows versions of Quattro Pro and Paradox. Customers purchasing Quattro Pro 3.0 can upgrade to the Windows version for $49.95. Purchasers of Paradox 3.5 can open a new Windows version for $139.95.

……

IBM, Compaq slash portable prices

The premium pair in the personal computer field cut prices on their portable lines last week. Compaq Computer Corp. slashed prices by up to 22% on all but the high end of its LTE notebook line, and IBM cut prices on its Personal System/2 L40SX laptop by 12%. With the new prices, Compaq's cheapest LTE, the Intel Corp. 8088-based M20, lists for $1,749 — 12.5% lower than before. The LTE/286, with a 40M-byte hard drive, lists at $2,249, about 20% less than before. IBM's L40SX, with a 60M-byte hard drive, is now $5,245. Analysts said Compaq's cuts were intended to reduce inventory, while IBM's cuts appeared to be directed at matching Compaq's street prices on the LTE 386S/20.

……

Lotus sues reseller

No stranger to the courtroom, Lotus Development Corp. filed another suit last week, this time against one of its resellers. It is charging Executive Photo and Supply Corp. in New York with unfair trade practices, including false advertising and contractual interference, for allegedly selling versions of Lotus' 1-2-3 and Magellan products manufactured for OEM distribution as standard retail packages. There are differences in documentation and feature sets among the packages. Lotus is seeking unspecified damages, attorney fees and injunctive relief.

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IEEE to release VDT safety standard

Instead of waiting for government regulation, the Institute of Electrical and Electronics Engineers, Inc. is scheduled to release its draft standard for electromagnetic and electrical fields from VDTs today. According to Dheena Moongilan, chairman of Group 1140 (standard procedures for measuring electric and magnetic fields), a final standard should be issued by the end of the year. The industry formed this group following consumer concerns over potential health effects from electromagnetic radiation from computers.

More news shorts on page 87

IBM, Adapso mourn software activist

BY NELL MARGOLIS
CW STAFF

IBM veteran executive and longtime software industry activist Robert F. Berland, 51, died last week after a nine-month battle with cancer.

"I don't know how we're going to get along without him," said Luanne James, president of software industry association Adapso. Berland served Adapso for many years in a variety of capacities, most recently as a director.

"Adapso has lost its conscience," said Dun & Bradstreet Software Chairman John Imlay, who was Berland's friend as well as a fellow Adapso veteran. "He was so different from everyone else — he always did what was right."

"Bob was a mover and shaker in the industry, but he did it for the right reasons," said his friend and former IBM colleague Sam Albert, president of Sam Albert Associates.

One particular difference Berland made, according to many accounts, was in the industry's view of his company.

Berland *improved IBM's image*

"He was great at putting a human face on IBM," said Frank Gens, an analyst at Technology Investment Strategies Corp. "He had a great sense of humor and of humility. In the face of IBM's reputation for arrogance, that made people stop and think." Berland's role as de facto ambassador was appreciated inside and outside IBM, Albert said.

In his 23 years at IBM, Berland held a wide range of positions rooted in software strategy. In 1987, he was appointed vice president of vendor and development operations; two years later, he became application solutions director of software and vendor support.

"Bob was always upset with signs of overgrown bureaucracy," Albert said, "and always strongly in favor of partnerships." Long before partnering was an industry buzzword, he said, Berland actively — and successfully — lobbied for it as an IBM strategy.

In recent years, Berland scored yet another outreach triumph as a major force behind Success 2000, Adapso's education awareness initiative.

Berland is survived by his wife, Ellen, and their son and daughter, Jay and Beth.

The Berland family requests that all donations be made to The Association for Brain Tumor Research, 3725 N. Talman Ave., Chicago, Ill. 60618.

Victim

FROM PAGE 1

The consolation prize, as described by Ballmer, is the planned 1992 delivery of a Windows New Technology-compatible version of LAN Manager.

LAN Manager Windows support kicks off with Version 2.1, which will connect to Windows 3.1 clients alongside OS/2, Unix and VMS servers, he added.

Twisting the knife even deeper into the heart of Microsoft's relationship with IBM, Ballmer also unveiled plans to build an OS/2 and Presentation Manager subsystem designed to migrate OS/2 applications to Windows New Technology.

The subsystem, combined with the Windows New Technology kernel, would comprise OS/2 3.0, he said. This turn of events could further cool IBM's already frosty views on the direction in which Microsoft has been taking OS/2 3.0. IBM executives have said they are examining other options and may not use the Microsoft-built software.

In an interview last week, Ballmer explained that the server convergence project has stalled and will probably not go forward. Although application programming interface compatibility, about 70% of the work, was achieved, interface and systems administration differences remain to be resolved, he acknowledged.

In addition, Mike Murray, general manager of Microsoft's networking business unit, claimed that "bit-for-bit convergence" was never promised. He added that IBM reiterated this point at least six months ago.

That is news to IBM, a spokeswoman for the company responded. She said IBM has not altered its position on plans laid out with Microsoft in November 1989, when the two vendors promised to address user complaints about incompatibility by "converging" their LAN Manager-based servers.

In January 1990, Murray warned that it might take until the first half of 1991 to produce identical file servers. IBM has not deviated from the November 1989 convergence promise, the IBM spokeswoman said. However, if Microsoft decides to alter the agreed-upon strategy, IBM will have to "reevaluate," she added, noting that it "takes two to converge."

The situation has added to concerns about whether there will be an OS/2 3.0. Ballmer said IBM's disinterest in the OS/2 3.0 project has resulted in IBM "not helping as much as they are supposed to at this stage."

Microsoft, meanwhile, is throwing its considerable resources behind Windows New Technology, which will be "enabled for server support," among other features.

Service surge

REDMOND, Wash. — Microsoft plans to aggressively improve its customer service sector this year, concentrating its efforts on bolstering beleaguered telephone support lines.

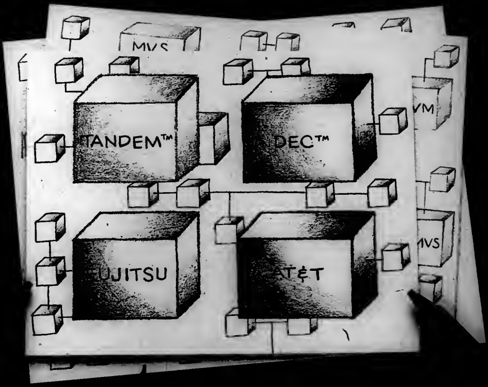
Technical support demands "simply outstripped our capabilities," Senior Vice President Scott Oki said last week. In the wake of the tremendous sales of Windows 3.0, Microsoft's product support service was averaging 9,400 calls a day by last January. The service could handle only 7,400.

Oki declined specific projections on how many new technicians would be recruited but said two-thirds of the new hires in the sales, marketing and services department will be in customer support. By next year, Microsoft's support service is expected to be able to handle all technical support calls and offer a customer response time of less than one minute, Oki said.

In an industry filled with products that are sometimes remarkably similar, many vendors are beginning to look to customer support as a way to differentiate their product and stay ahead of the competition.

The improved customer support services, however, are likely to take a bite out of Microsoft's financial bottom line. "It's a much needed move, but it's going to be a costly [one] . . . because support people aren't true revenue generators," said Robert Kleiber, a research analyst at Piper, Jaffray & Hopwood, Inc. in Minneapolis.

JAMES DALY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Unisys jobs

FROM PAGE 1

said they felt Unisys' increasingly standards-based hardware and software would compensate for having fewer people.

"When you lose that number of people, let's face it: You're not just cutting overhead," said Peter Sarro, a computer systems programmer at the Naval Computers and Telecommunications Station in Newport, R.I.

"I think they are well past flab at this point, frankly," agreed Unisys watcher George Lindamood at Gartner Group, Inc. in Stamford, Conn.

However, Clifford E. Cox, assistant superintendent of the Department of Information Processing at the Chicago public schools and a longtime Unisys user, said downsizing such as Unisys' is not without precedent in the industry and will not be too disruptive. "Unisys recognizes, as does IBM, that the answer is standardization and less complexity from the user perspective," Cox said.

Cox added that he was not overly concerned about the future of his Unisys 1100 and 2200 mainframes because those platforms are widely deployed in the government sector.

Unisys President and Chief Operating Officer Reto Braun stated that Unisys would increasingly focus on markets where it already has a strong presence, such as banking and transportation.

"Instead of so many businesses in which we have 1% or a half a percent of market share, I want to get into the [double] digits," he said.

Meanwhile, Unisys customers were trying to plan for future events, including a "buyout" scenario in which some or all of Unisys may be purchased.

That has federal customers particularly concerned, said Sarro, who runs a U.S. Department of Defense special interest group for Use, Inc., one of the domestic Unisys user groups.

If the buyer is a non-U.S. company, Sarro said, it would be prohibited from servicing Unisys equipment for defense-related customers. "Who'll continue to service our stuff then?" he asked.

For the most part, the Unisys customer base seemed to take the latest news in stride.

"Knowledgeable people in the user community will treat it as a wash or as positive," said Dean T. Sutton, executive vice president at Softchec, Inc. in Kirkland, Wash., and the immediate past president of the Cube, Inc. Unisys user group.

Sutton predicted that most customers will place Unisys' defensive actions in the context of industrywide difficulties in the mainframe marketplace.

Still, Sutton allowed that some users, facing the prospect of diminished field support, "may turn around and jump ship."

Unisys did obtain some breathing room from its lenders on a $1.25 billion revolving credit line last week. A consortium of 20 banks amended a "net worth covenant" under which the banks could have called the loan and forced Unisys into bankruptcy if the company's value fell below $3.5 billion.

However, the banks agreed to move the net worth figure down to $2.05 billion, giving Unisys, with a recalculated net of $2.305 billion — a $255 million cushion.

May 1986:
The union of Sperry Corp. and Burroughs Corp. into Unisys created a work force of some 122,000 employees.

Dec. 1986:
By selling off various units, Unisys cut the work force to 103,000 by the end of the year.

Oct. 1989:
8,000 positions were slated to be cut.

Oct. 1990:
A 5,000-person reduction was scheduled.

July 1991:
More than 6,000 staff members will be cut by the end of the year.

1992:
Up to 4,000 jobs will be cut by June 30.

CW Chart: Janell Genovese

A time to pare back

Ever since its creation in 1986 from the merger of Sperry Corp. and Burroughs Corp., Unisys has struggled with a diverse product portfolio that included three mainframe lines, a Unix server family, minicomputers, proprietary networked workstations and DOS-based personal computers.

Last September, Unisys unveiled the Integrated Information Environment, a client/server architecture that spelled out how Unisys systems can interoperate with one another and with systems from other vendors. The architecture rests on a mix of proprietary, de facto and open systems standards.

The architecture was "a watershed," according to analyst George Lindamood at Gartner Group, Inc., who said it provided "some sort of criteria" to users about which Unisys product lines would be retired or folded into others.

But it was not until last week that Unisys made explicit its plans to "de-emphasize" some lines. Analysts and users generally faulted the company for taking so long to pare down its products.

Unisys President and COO Reto Braun accepted some of this criticism as valid but said the important thing was that hard decisions have been made.

Specifically, Unisys said it will de-emphasize its V series mainframe line and will not pursue follow-on products.

"Some customers are disappointed, but we can't afford it," Braun said. He noted that earlier this year, Unisys delivered a new top-end V series, which he said will satisfy the power needs of "99%" of the user base for the next two or three years. A migration path from the V to the A series mainframe is being developed, Braun said, in the form of an add-on card that would allow the A series to run V series applications.

Unisys also announced the end of the System 80, a minicomputer from the Sperry side of the house, and its OS/3 operating system.

Regarding the Intel Corp. i486-based U 6000 series Unix processors, Braun said a review was under way regarding whether to manufacture internally or contract out for those systems.

ELLIS BOOKER

DG hews to profitable path with few walking partners

BY SALLY CUSACK
CW STAFF

With much of the computer industry hemorrhaging around it, Data General Corp. last week posted its third consecutive profitable quarter, earning the payback from drastic restructuring actions that other firms are just now undertaking.

DG was one of the few companies that had anything to cheer about last week: Digital Equipment Corp. and Unisys Corp. both announced plans for major job cuts (see stories page 1); in the personal computer industry, while Microsoft Corp. continued to enjoy boom times, Compaq Computer Corp. was faced with ebbing sales (see story page 4).

DG reported operating income of $26.2 million and a net profit of $35.6 million, including a onetime profit gain of $13 million from the sale of its Japanese subsidiary, Nippon Data General. During the third quarter last year, the company had posted a net loss of $21.4 million, or 71 cents per share.

DG President and Chief Executive Officer Ronald Skates warned that the company is "very cautious for the short term in light of current economic conditions, particularly in the European marketplace."

For other companies, economic conditions had already taken a toll.

In California, Amdahl Corp. said that second-quarter profits nosedived to just $6.4 million, down from $46.3 million one year earlier. Revenue for the mainframe manufacturer slumped to $450.6 million, down from $519.2 million.

The company cited weak European markets and price competition as major factors in the downturn.

Wang Laboratories, Inc., headquartered in Lowell, Mass., posted a $314.5 million net loss for the fourth quarter, including restructuring costs and other special charges totaling $234.6 million.

For the fourth quarter in 1990, Wang had reported a net loss of $496.7 million.

Uncertainty plagues Wang midrange

BY SALLY CUSACK
CW STAFF

The dust is finally settling after the unexpected agreement last month by Wang Laboratories, Inc. to resell IBM computers. But loyal Wang VS customers are still unclear as to just what the future holds for the proprietary midrange platform.

The good news for smaller, midsize VS users is that they still have some headroom left before having to look for a migratory alternative, while some high-end VS 10000 shops may have hit the limit with both hardware horsepower and operating system capacity.

"We have a lot of options," said Bert Regensburger, director of MIS at Jewels by Park Lane, Inc. "We can go to the VS 100, 7000, 8000 or even 10000 as a platform, and we are on an older version of the operating system, so we have upgrade potential there, too."

The Chicago manufacturer and distributor is using a Wang VS 85 for all order entry, accounting, inventory and sales and marketing applications. Regensburger said he feels that the VS will have a long life in the secondhand market.

John R. Boots Jr., who is charge of a VS 5300 at Stringer Tire Co. in Jacksonville, Fla., was initially so concerned about the IBM and Wang alliance that he faxed a letter to Wang Chief Executive Officer Richard Miller. "It took about 10 days, but he did reply," Boots said. "He assured me that the VS is still a viable platform and said that the company would roll out another high-end and low-end VS machine."

Boots said he hopes to stay on the VS for a "long, long time" and he feels the machine is unparalleled for ease of use.

While Miller is reassuring edgy customers these days that there is life left in the VS platform, some questions remain.

"Most of the user community realizes that Wang needs to change, and the company deserves credit for some very far-sighted moves," said Matthew J. Gillman, president of the United States Society of Wang Users.

However, Gillman said, the vendor could do a better job of communicating just what the new strategy will involve. While Wang said it will establish migration centers for users desiring a VS-to-IBM Application System/400 conversion, the details are still not in place.

It may be appropriate for many of the smaller shops to migrate to IBM AS/400 technology, Gillman said, but criteria must be established to rationalize that migration.

Some VS users are concerned about what they should be looking to Wang for in terms of service and support and what they should be looking for outside the company.

Barry B. Edison, director of Juvenile Justice Information Services (JJIS) for the city of New York, said that while he does not know which direction Wang will take in the next year, he is confident the VS will not be abandoned.

Frank Ryan, a spokesman for Wang, said research and development commitment to the VS is "quite substantial" and that there are "several hundred people" involved in VS products.

The vendor anticipates the next installment of Office 2000 announcements, to be made in the early fall.

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IBM, CA skirt SQL standard access group

BY ROSEMARY HAMILTON
CW STAFF

Despite recent industry efforts to establish a standard method for users to access relational data, both IBM and Computer Associates International, Inc. are determined to push their own approaches to achieve the same goal.

In the long term, users could see a merging of these efforts because they all spring from the same international standards. In addition, both companies said they have not ruled out joining the SQL Access Group, an industry group that released initial specifications for accessing data in various relational database management systems earlier this month.

However, the short term will bring conflicting messages as each party attempts to position its plan as the one that best meets users' needs.

Last week, IBM and CA executives commended the recent effort by the SQL Access Group, which claims 42 systems and software companies as members. At the same time, executives pointed to their own companies' strategies as responses to their customers' requirements.

The firms and the SQL Access Group have all been working with SQL and Remote Data Access (RDA) specifications as established by the American National Standards Institute and the International Standards Organization. But each has put its own spin on these specifications.

"We have been working side by side with their members, meeting them regularly in standards bodies for RDA and SQL," said George Zagalow, manager of architecture and standards at the IBM Santa Teresa Laboratory. "Their primary thrust is to expedite interoperability. Ours is to satisfy a different range of requirements."

The SQL Access Group, established about two years ago, is focusing on access in a heterogeneous environment. The idea is to provide a standard that could be used by front-end tools to access a host of different RDBMSs in a networked environment. It will tackle more advanced issues such as performance and transaction processing in the future.

IBM's approach is exactly the opposite. It has been working on this issue since the mid-1980s, and last year, it released its solution: an architecture known as Distributed Relational Database Architecture (DRDA).

Unlike the SQL Access Group effort, DRDA is not geared toward a heterogeneous environment. While IBM is planning to address non-IBM platforms in the future, it is currently focusing DRDA on links between its existing RDBMSs and performance issues, which are central to its large-systems customers' concerns.

"We are not trying to compete with IBM, and we would like them to join," said Jeff Balboni, technical chairman of the SQL Access Group, "We are trying to accommodate all systems, while IBM is targeting more high-end systems. Distributed Relational Database Architecture is a real good architecture, and I've offered to them the idea that we work together."

CA maintains that it has been working to incorporate specifications directly from the standards bodies into its product line. Currently, "we already have most of Phase 1 [of the SQL standard] in the CA '90s layer of services," said Dominique Laborde, vice president of research and development.

Tera gets $7.5M DARPA grant

BY GARY H. ANTHES
CW STAFF

SEATTLE — Tera Computer Co. said last week that it has been awarded $7.5 million from the Defense Advanced Research Projects Agency (DARPA) to develop a Unix-based parallel processing supercomputer for general scientific use. Tera said it will be 100 times faster than today's supercomputers, will cost $30 million to develop and will be commercially available late in 1993.

James E. Rottsolk, Tera's chief executive officer and president, said the machine will have as many as 256 64-bit processors and will sell for up to $40 million. Each processor will have a peak performance above 1 billion floating-point operations per second (GFLOPS) and will be built to proprietary specifications by a company be would not name.

DARPA has helped fund several highly parallel systems, including those from Thinking Machines Corp. and the supercomputer division of Intel Corp. According to Rottsolk, Tera's entry into that market niche will be unique in using a shared-memory architecture. The distributed memory approach, in which each processor has its own local memory, is far more difficult to program, be said.

"On the technical issues, they have a concept that should work," said supercomputer analyst Gary Smaby, president of Minneapolis-based Smaby Group, Inc. "But can [Tera] raise the money? That may be another story."

Rottsolk said the 256-processor model would peak at 300 GFLOPS, with sustained rates of more than half that level.

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Unix OLTP plan unfolds

BY ROSEMARY HAMILTON
CW STAFF

Unix International, Inc. last week outlined a strategy to provide users with online transaction processing (OLTP) capabilities, a mainstay of commercial computing for which the Unix operating system had long been deemed unsuitable.

At the same time, Unix Systems Laboratories, Inc. released an extended version of Tuxedo, its OLTP software. One extension provides access to IBM's CICS for Tuxedo users, while a second feature will enable several personal computer platforms to function as clients in a Tuxedo environment.

The Unix International move addressed one component of a broad architecture, called Atlas, that it introduced early this year. Essentially, Unix International identified key technologies, most of which already exist, to make up Atlas' Corporate Hub Computing component.

Although most of these technologies exist, they will not be offered as an integrated set of functions for at least another year, according to David Sandel, vice president of marketing at Unix International.

The Unix International announcement also identified Tuxedo as a reference technology for the Corporate Hub Computing component.

While Unix International tackles the architecture, at least one user site is making a go of Tuxedo itself. Michael Prince, director of information systems at Burlington Coat Factory Warehouse Corp., installed Tuxedo earlier this year on Sequent Computer Systems, Inc. and Sun Microsystems, Inc. platforms.

With the increased attention on transaction processing in the Unix world, Prince said he saw a way to move to an open, real-time OLTP environment. "By the first of the year, it will be processing all of our transactions," he said of the Tuxedo software.

Inslaw papers subpoenaed

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — Records thought to bear on an 8-year-old dispute between the U.S. Department of Justice and software developer Inslaw, Inc. brought two branches of the federal government closer to confrontation last week.

A subpoena issued last week by the Judiciary Committee of the U.S. House of Representatives was a last-ditch effort by the committee to pry 456 documents from Attorney General Richard Thornburgh. The committee is probing allegations that the Justice Department stole Inslaw's software and tried to drive it out of business. Thornburgh promised on several occasions to turn over the documents but has failed to do so.

Committee Chairman Jack Brooks (D-Texas) said last week that a number of the documents are now reported by the Justice Department to be missing, and he said the department had failed to explain how the records were misplaced.

Last week, Rep. Edward Feighan (D-Ohio) called for the attorney general to resign, saying, "I'm sorry that this dispute has come to an impasse, and I continue to be baffled by the Justice Department's stonewalling on the Inslaw investigations."

The dispute between the Justice Department and Inslaw, based here, dates back to 1983, when the department stopped paying Inslaw on a $10 million contract for the use of Inslaw's case-tracking software.

The firm ended up in bankruptcy court where a judge ruled in 1988 that the Justice Department had stolen Inslaw's software and had conspired to drive it out of business. He ordered the department to pay Inslaw $8 million [CW, April 1].

The Justice Department lost an appeal two years later but won at least a temporary victory this year when an appeals court ruled that the bankruptcy court lacked jurisdiction in the case.

In a letter last week to Brooks, Assistant Attorney General W. Lee Rawls wrote that the delay in providing the documents stemmed from the committee's recent decision to ask for more records than had originally been specified.

Brooks made it clear his patience in the Inslaw investigation had worn out: "Almost two years from [Thornburgh's] first pledge of full cooperation, the committee still has not been allowed to review 456 documents . . . I simply cannot permit legitimate oversight to be forestalled by dilatory or evasive steps."

Brooks said he hoped the matter could be resolved "without [our] being forced to hold our nation's highest law enforcement agency in contempt of Congress."

Brooks also reported an eleventh-hour effort by the Justice Department to head off a subpoena. He said a Justice Department official offered to make the Inslaw documents available for review the evening before the committee was to vote on whether to issue the subpoena. The offer was rejected as insufficient. "A summary of the documents alone runs 123 pages of single-spaced description," Brooks said.

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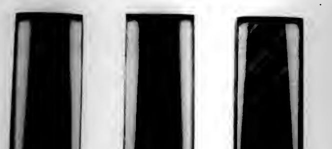

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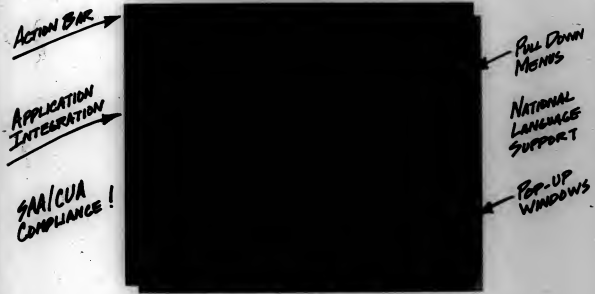

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Group dupes security experts

Houston-based Comsec fools consultants to gather security information

BY MICHAEL ALEXANDER
CW STAFF

HOUSTON — Computer security consultants are supposed to know better, but at least six experts acknowledged last week that they were conned. The consultants said they were the victims of a bit of social engineering by Comsec Data Service, Inc., a security consulting firm recently launched here.

Comsec masqueraded as a prospective customer using the name of Landmark Graphics Corp., a large Houston-area software publisher, to gather information on how to prepare business proposals and conduct security audits and other security industry business techniques, the consultants said.

Three of Comsec's four founders are self-professed former members of the Legion of Doom, one of the nation's most notorious hacker groups, according to federal law enforcers [CW, June 24].

"In their press release, they say, 'Our firm has taken a unique approach to its sales strategy,' " said one consultant who requested anonymity, citing professional embarrassment. "Well, social engineering is certainly a unique sales strategy."

Social engineering is a technique commonly used by hackers to gather information from helpful but unsuspecting employees that may be used to penetrate a computer system.

"They are young kids that don't know their thumbs from third base about doing business, and they are trying to glean that from everybody else," said Randy March, director of consulting at Computer Security Consultants, Inc. in Ridgefield, Conn.

The consultants said gathering information by posing as a prospective customer is a common ploy but that Comsec violated accepted business ethics by posing as an actual company.

"It is a pretty significant breach of business ethics to make the misrepresentation that they did," said Hardie Morgan, chief financial officer at Landmark Graphics. "They may not be hacking anymore, but they haven't changed the way they operate."

Morgan said his firm had received seven or eight calls from security consultants who were following up on information they had sent to "Karl Stevens," supposedly a company vice president.

Same old story

The consultants all told Morgan the same tale: They had been contacted by "Stevens," who said he was preparing to conduct a security audit and needed information to sell the idea to upper management. "Stevens" had asked the consultants to prepare a detailed proposal outlining the steps of a security audit, pricing and other information.

The consultants had then been instructed to send the information by overnight mail to a Houston address that later proved to be the home of two of Comsec's founders. In some instances, the caller had left a telephone number that when called was found to be a constantly busy telephone company test number.

Morgan said "Stevens" had an intimate knowledge of the company's computer systems that is known to only a handful of employees. While there is no evidence that the company's systems were penetrated by outsiders, Landmark is "battening down its security hatches," Morgan said.

Posing as a prospective customer is not an uncommon way to gather competitive information, said Chris Goggans, one of Comsec's founders, who once used the handle of Eric Bloodaxe.

"Had we not been who we are, it would be a matter of no consequence," Goggans said.

"They confirm definitely that they called some of their competitors," said Michael Cash, an attorney representing Comsec. "The fact they used Landmark Graphics was an error on their part, but it was the first name that popped in their heads. They did not infiltrate Landmark in any way."

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CW0791

Push is on to install fast Token Ring LANs

BY JOANIE M. WEXLER
CW STAFF

Obstacles to 100M bit/sec. local-area networking could be a boon to the 16M bit/sec. Token Ring market, users said on the heels of a promotion announced last week by Madge Networks, Inc. to steer customers into the 16M bit/sec. arena.

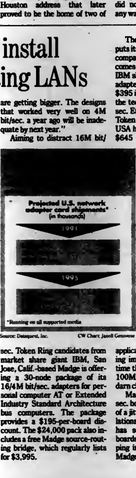
"We need greater bandwidth than 4M bit/sec., and while we've been waiting for [100M bit/sec.] Fiber Distributed Data Interface products on copper or fiber that are priced right, 16M bit/sec. Token Ring has become tested and proven over unshielded twisted-pair," said Jonah Giacalone, an information systems officer at New York-based Manufacturers Hanover Corp.

Manufacturers Hanover faces looming backbone network integration issues with merger partner Chemical Banking Corp. One impetus to moving from 4M to 16M bit/sec. networking will be the scores of new users added to a common backbone, Giacalone said.

Size demands

Jim Finch, a senior technical consultant at American Express Co., The Shareholder Services Group, said, "We need the bandwidth for rings that we will populate with heavy users, imaging and networked applications that are getting bigger. The designs that worked very well on 4M bit/sec. a year ago will be inadequate by next year."

Aiming to distract 16M bit/sec. Token Ring candidates from market share giant IBM, San Jose, Calif.-based Madge is offering a 30-node package of its 16/4M bit/sec. adapters for personal computer AT or Extended Industry Standard Architecture bus computers. The package provides a $195-per-board discount. The $24,000 pack also includes a free Madge source-routing bridge, which regularly lists for $3,995.


Projected U.S. network adapter card shipments* (in thousands)

*Running on all supported media

Source: Dataquest, Inc. CW Chart: Janell Genovese

The Madge move — which puts its card prices at $800 each, compared with IBM's $895 — comes about two months after IBM slashed its 4M bit/sec.-only adapter cards by nearly 50% to $395 in a stated move to position the technology against 10M bit/sec. Ethernet LANs. Since then, Token Ring competitor Olicom USA has dropped its prices from $645 to $400; however, major competitors such as Proteon, Inc. and Digital Communications Associates, Inc. have stood by their 4M bit/sec. prices of $550 to $795.

Madge President Robert Madge said his promotion "is related to IBM's price cuts in that IBM has recognized that the 4M bit/sec. market is over."

However, Frank Michnoff, program director at consultancy Meta Group, Inc. in Westport, Conn., disagreed.

"I don't see a wholesale move to 16M bit/sec. The sophisticated applications requiring it are being implemented slowly. By the time they arrive three years out, 100M bit/sec. LANs might be darn cheap."

Madge recalled its 16/4M bit/sec. boards in June 1990 because of a jitter problem in large installations. However, the vendor has sold "well over 20,000" boards since it started reshipping in December, according to Madge.

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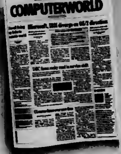

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ADVANCED TECHNOLOGY

TECH TALK

Zippy DSP

■ Researchers at Queen's University in Belfast, Northern Ireland, have developed a digital signal processing (DSP) chip capable of performing calculations up to 10 times faster than commercially available programmable DSP devices. The DSP chip can perform 250 million multiplications and additions per second, said John McCanny, chairman of microelectronics engineering at the university. It can be used in communications systems, high-definition television, aerospace and radar.

More than a token market

■ Texas Instruments, Inc. shipped its one-millionth Token Ring chip set recently. It is a milestone that underscores the broad acceptance of the Token Ring standard in the local-area network market, the company said. TI manufactures components used by network and computer OEMs in network adapter cards, network servers and other products. Token Ring networks have become the fastest growing segment of the LAN market since their introduction in 1985, TI said. The market will grow at a 22% compound annual growth rate through 1995, according to Dataquest, Inc., a San Jose, Calif.-based market research firm.

Calling Dick Tracy

■ Miniature, wireless handsets, similar to the Dick Tracy wristwatch telecommunicator, will trigger a whole new telecommunications industry, according to some analysts. The pocket-size devices make up an emerging industry called personal communications services, said BIS Strategic Decisions, a market research firm based in Norwell, Mass. Personal communications services will be used in businesses, homes and autos in such areas as personal security, location service and vehicle navigation. Subscribers will have a personal identification number that will be assigned to them permanently.

Delving into the depths of the Earth

Supercomputers are helping geophysicists better understand dynamics of the Earth

BY CLINTON WILDER
CW STAFF

Although the 1989 Loma Prieta earthquake in California and the recent eruption of Mount Pinatubo in the Philippines were catastrophic events for people and property, they were really just small blips in the multimillion-year history of the Earth's dynamics. Yet gaining more knowledge of those dynamics could give geophysicists a better understanding of the forces that cause earthquakes, volcanic eruptions and other natural events.

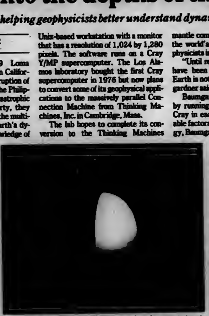
Complex geophysical models running on Cray Research, Inc. supercomputers are helping researchers at Los Alamos National Laboratory journey to the center of the Earth without leaving their workstations.

"The problem with understanding the interior of the Earth is we have to sense it remotely," said John Baumgardner, a technical staff member in the Theoretical Division at Los Alamos. "We can't take actual measurements of the material properties, so numerical modeling is extremely helpful in taking the limited observational data that we have and developing a coherent picture of what's going on."

Ten years ago, Baumgardner wrote the basic Fortran code for three-dimensional geophysical modeling for his master's thesis. Today, he — along with fellow researchers Gary Glatzmeier and Brian Travis at Los Alamos' Earth and Environmental Sciences Division — are using those models to plumb the Earth's depths.

Baumgardner does his geophysical research on a Tektronix, Inc. 4336 Unix-based workstation with a monitor that has a resolution of 1,024 by 1,280 pixels. The software runs on a Cray Y/MP supercomputer. The Los Alamos laboratory bought the first Cray supercomputer in 1976 but now plans to convert some of its geophysical applications to the massively parallel Connection Machine from Thinking Machines, Inc. in Cambridge, Mass.

The lab hopes to complete its conversion to the Thinking Machines CM-2 sometime this fall, then upgrade to the newest Connection Machine in early 1992. "On the code we've converted so far, we've seen 10 times better performance," Baumgardner said.



Los Alamos National Laboratory *is using computers to study the layers of the Earth, from crust to core*

Baumgardner's computer models are based on the premise of breaking down one massive computing challenge into thousands of smaller ones. The models depict the Earth as 33 separate layers from crust to core, with the average layer about 100 kilometers deep. Each model layer is a multigrid "mesh" of 80,000 triangular sections.

The mesh layers enable the Earth's mantle to be modeled as a spherical shell. Los Alamos has the only spherical mantle computer model in the U.S. — the world's other one is used by geophysicists in France.

"Until recently, most of the models have been two-dimensional, but the Earth is not a rectangular box," Baumgardner said.

Baumgardner tests his hypotheses by running physical equations on the Cray in each triangle. Using the variable factors of mass, velocity and energy, Baumgardner can plot the theoretical behavior of the tectonic plates of the Earth's crust in relation to the massive mantle they cover. Among other challenges, the Los Alamos researchers are trying to determine what caused the hypothetical land mass called Pangaea to break apart to form the continents and oceans.

"The plates play an important role in the behavior of the mantle," Baumgardner said. "I sometimes think of the Earth's crust as a cold skin covering a very hot body — it can behave in an elastic or brittle fashion. Most earthquakes and volcanoes occur where the plates are diving back toward the interior of the Earth."

Although the Los Alamos researchers have made great strides in understanding the Earth's behavior from a global perspective, the accurate pinpointing of localized geophysical activity, such as earthquakes, remains a long way off. With the next generation of Connection Machine, Baumgardner said, he hopes to increase the computer resolution to simulate activity in layers as small as 50 kilometers thick. But that is still not small enough to accurately model the tectonic plates that cause earthquakes. That type of resolution "is still somewhat of a dream at this point," Baumgardner said.

Viewing earthquakes on 3-D video

Earthquakes are a part of life in Northern California, and seismologists at the U.S. Geological Survey (USGS) office in Menlo Park get to watch them on their computer screens in three-dimensional video.

Seismologists Fred Klein and Steve Walter have created a method that converts seismic sensor data into 3-D video animation so they can "watch" any earthquake from the USGS database of Northern California earthquakes dating back to 1969.

Fortran code developed by Klein reformats Digital Equipment Corp. VAX-based data, such as the location, magnitude and time of an earthquake, into an ASCII file. Klein or Walter then downloads the file to a Commodore Business Machines, Inc. Amiga 2000 running Videoscape 3-D graphics software from Oxxi, Inc. in Newport Beach, Calif. They can also do time-lapse animation, speeding up months or years of seismic activity in a given location to a few seconds.

"When I started the project, I wanted it to be useful scientifically, to see something we couldn't otherwise see," Klein said. "But there is also the advantage of public display, to communicate to the public what we're doing."

Klein's wishes have been more than fulfilled. USGS has produced a videotape of its animation of the 1989 Loma Prieta earthquake aftershocks, and its work has been featured on the public television program Nova. Next on the agenda is an interactive touch-screen display in the USGS office lobby.

CLINTON WILDER

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EDITORIAL

Stunted growth

As the U.S. computer industry continues to realign and reconstitute itself in somewhat dramatic fashion, its European counterpart continues with its own revolution — or we should say disappearing act.

Most recently, Bull tightened its relationship with Japan's Nippon Electric in a way that some observers say presages an eventual major equity stake in Bull by NEC. Recent reports have the Netherlands' Philips Electronics talking with various suitors, such as DEC, about buying its long-suffering IS division. Italy's Olivetti is rumored to be looking for a buyer.

The UK's ICL is today a subsidiary of Fujitsu, while Finland's Nokia Data recently became a subsidiary of ICL. The remaining European bulwark is Germany's Siemens, which is still struggling to digest Nixdorf a year after it acquired that sagging systems maker.

Weaned on fat government contracts and burdened by union regulations, most European companies are simply not able to compete, either independently or as part of the rising European brotherhood of 1992. Europe is cashing out of one of the few remaining growth industries, choosing to mortgage its future instead of just changing its ways to meet the changing times. Someone ought to ask just whose side the government regulators and union leaders are on.

That's not to say the gut-wrenching, layoff-producing upheavals in the U.S. computer industry are a bed of roses. But at least when the dust settles, a viable U.S. vendor community will still be alive and kicking hard.

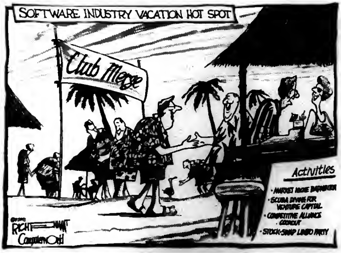
Open for business

You don't have to look far these days to get some clear affirmations of the accelerating customer preference for open systems and standards-based hardware.

This month, AT&T landed one of the biggest computer contracts in history: a $1.4 billion whopper to supply Unix-based systems to the IRS. The company beat out IBM amid hints that AT&T's bid wasn't even the lowest. But the customer found it to be the best, in large measure because of the coalescence of AT&T's strategy and an open systems commitment.

Last week, Data General, which was pretty much given up for dead not so long ago by many observers, showed that an old-line proprietary minicomputer firm can find renewed life in an open systems commitment (see story page 8).

The companies sticking most stubbornly to proprietary solutions, most notably IBM, are increasingly finding that strategy to be out of step with the general direction of the marketplace. Others such as NCR and Hewlett-Packard have made wholesale changes in their product lines. It is no wonder companies like these thus far have been spared the worst of the recession-induced ravages.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LETTERS TO THE EDITOR

Cheers to the VS

Your article "Wang opts for reseller role" [CW, June 24] seems to indicate that the Wang VS is no longer a viable hardware platform. I sincerely hope that you are wrong. The VS was and still is the best and most user-friendly minicomputer system in the marketplace today.

I have been exposed to the VS for more than a decade and have had the pleasure of automating two companies using Wang VS hardware.

My response to the inference that the VS users will be migrating to the Application System/400 is this: "Over my dead body!"

If I had wanted to automate my company with inferior hardware, I would have gone to IBM in the first place. IBM has nothing worth mentioning to offer in the midrange. The System/36 was and is a perfect boat anchor disguised as a computer. The AS/400, by all accounts, is not much better.

It is deeply unfortunate that IBM, just because they are IBM, can sell anything.

If the VS is phased out and we are ultimately forced to migrate, it will not be to IBM.

John R. Boots Jr.
Controller
Stringer Tire Co.
Jacksonville, Fla.

Resume risks

Regarding "Networks aid hiring searches" [CW, June 24], when hiring managers join informal networks to share resumes they've received in an effort to decrease costs, they may indeed reduce the recruiting budget. In the long run, I believe that such actions will end up costing them dearly.

Passing resumes around without prior permission violates trust and, in fact, could place the applicant at great risk of having his current employer learn about his job search prematurely.

As word gets out that specific companies participate in this kind of activity, their reputations will surely suffer.

Hiring a search firm will become the only way to recruit good people to their organization because the best candidates won't risk dealing directly with companies that have a reputation for handling resumes in an unprofessional manner.

When a job hunter submits a resume to a recruitment network, he's taking a calculated risk that it won't jeopardize his current employment.

When he submits a resume to a specific company, however, he should have every right to assume that it will be treated as a confidential document, intended to be read only by the hiring manager at that specific company.

Deborah Lamalie Allen
Technical recruiter
Hochaman & Associates
Cleveland, Ohio

C-ing the light

In "Cobol: The successful failure" [CW, June 24], John M. Bradley asserts that "any seasoned C programmer knows that the only thing worse [than working on a 100,000-line Cobol program] is working on most 100,000-line C programs."

Most seasoned programmers know that while every language has flaws, most languages can be used for any programming project. Some are easier than others to use in a specific project, possibly stemming from the original intent of the language designer.

In a business environment, Cobol has the definite advantage of having well-defined, static data structures, reflecting the static nature of the structure of business data.

The C language was originally designed as a systems programming language but turned out to be a very general-purpose language suitable for almost any programming need.

This generality brings about the need for a greater amount of "housekeeping" than a language such as Fortran or Cobol, but it seems to us that the increased generality more than offsets this problem, especially when C's modularity and ease of implementing functional decomposition is considered.

As seasoned C programmers, we would prefer to use the right tool for the right job.

Unfortunately, Cobol does not have the features and programming constructs for the type of programming projects we are involved with, and sometimes C is a bit too low-level for some simple things.

Terry J. Gardner
David R. Woods
GE Consulting Services
Atlanta, Ga.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor In Chief,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail:* COMPUTERWORLD. *Please include a phone number for verification.*

How to get time on your side

If you're bedeviled by duties, these time-savers can help you break free

MICHAEL B. COHN

Maybe it's the economy. Or increased competition. Or maybe it's just the guy down the hall dumping his stuff in my in-basket. Whatever it is, I'm definitely working harder these days. And I don't think I'm alone in this.

IS in the '90s is definitely leaner and meaner. We are all feeling the pinch. Hours are longer. To-do lists are doubling in size. We try to squeeze every second out of every day. Now more than ever, we need time management.

Of course, there are plenty of things you can buy for this problem. There are those little computerized gizmos that fit in your coat pocket. Those neat little gadgets can really do a number on your calendar, especially when your 6-year-old mistakes yours for a TV remote and wipes out April searching for the Disney Channel.

If that method doesn't work, there are those nice leatherlike time management notebooks with all the optional extras like dividers, organizers, calendars, tabs, worksheets and stacks of blank to-do forms. With one of these babies, you can act very organized and look very important and pay for it all in only 12 convenient, monthly installments of $39.95.

Save your money. Don't waste your time. There are easier and cheaper ways to make sure that you get home for dinner. Try a couple of these.

• Multitasking

Computers do it, so you can, too. Once you get the hang of it, it's not very hard to do a bunch of stuff all at once. But folks who have trouble walking and chewing gum at the same time had better start slow.

Begin by running a program. Then, while having an abend, start an argument with an irate user. While all this is going on, also try having a sandwich, chatting with the boss and having a fight on the phone with your ex. After a few weeks of this, you'll even be able to squeeze in a few gulps of ulcer medicine.

• Virtual time

Turn one hour of real time into 16 hours of "virtual time." It's easy once you get used to the idea, and it's definitely worth the effort. After all, look what "virtual" did for storage.

In the virtual world, belief is reality. You run as if you are doing a lot, while you're really only doing a little. No one has to know the difference. Reminds me of when I was dating.

M. E. Cohen

Anyway, virtual time is the same thing. The way it works is like this: You run a program today that you won't even start coding till tomorrow, which you already debugged last week. Saves all kinds of time.

Sound impossible? No more than a virtual budget, and the government has had one of those for years.

• Up-to-the-minute tools

There's no sense squeezing to-dos into a day when they're the wrong to-dos in the first place.

Most IS shops still use techniques from the '60s. Get with it! Get some re-engineering tools and repositories and relationship diagrams and all that neat stuff to help you out with that two-year application backlog. You'll code new systems in no time.

Of course, you may eat up a few days picking out a CASE package. And you might spend megaweeks figuring the thing out. And plan on a month or six for installation and testing and tuning and training. But when that's over, you'll be all ready to go . . . just in time to attack that three-year application backlog.

• Synergy

Do you want big productivity from small teams? Do you want more results in less time? Then practice synergy. But not that tired old synergy of the '80s. You need the new IS synergy of the '90s. That's when you get three people coding like they were four people, while still paying them as if they were two people.

Cohn is trying to be a computer salesman in Atlanta.

IS and top management have some talking to do

LOUIS FRIED

The information technology trade magazines periodically carry surveys of the current worries and concerns (euphemistically called "issues") of IS executives. Occasionally, a publication takes the initiative of surveying the top business managers of many of the same companies in regard to their issues about IS. When opinions from the two sources are juxtaposed, some important differences emerge.

IS executives apparently do not fully recognize top management's concerns about obtaining real-time information to help them run the business and make tactical decisions. Nor do they appear to give adequate weight to management's concerns about maintaining the security and integrity of information assets.

On the other hand, top management is apparently ignorant of IS executives' concerns about hardware limitations.

Such differences are important, and each of the parties needs to make the other aware of its concerns. What's even more revealing about these lists, however, is the depth of difference in perspective between top management and IS executives on even those issues that both groups agree are very important.

Cost conundrum

Top management, for example, talks about controlling IS costs, while IS executives refer to the same issue as "budget constraints."

Management wants to reshape the business in order to take advantage of information technology, but IS sees resistance to change by senior management's lack of commitment (often expressed through budget constraints).

Management wants to use information technology to gain competitive advantage. IS feels that corporate bureaucracy is the main problem in trying to gain acceptance of new technology or restructuring for competitive advantage.

CEOs wish they could align IS with corporate strategic requirements, but IS executives are struggling with the tactical problem of meeting the changing needs of internal customers.

Most top managers have become unhappy with the continual failures of organizational units to improve internal coordination by creating an adequate flow of critical information across organizational boundaries. They would like to see improvement through the creation of cross-functional systems that permit appropriate organizations to share information.

The IS executive, on the other hand, thinks the integration of systems that has been going on for the past 15 years has been addressing that very problem. If it hasn't succeeded completely, that is the result of corporate bureaucracy.

Applications failure

Top management has also become increasingly impatient with the failure of the systems development function to deliver new applications that are relevant to the business units' needs, on time and within cost. IS executives, however, see the problem in terms of budget constraints and fickle internal customers.

Tight budgets, they contend, make it difficult to acquire new methodologies, tools and techniques as well as to attract and retain quality professionals, who require competitive salaries and modern equipment. On-time delivery is also difficult, they say, when customers are reluctant to commit adequate resources for projects and when customer needs are constantly changing during the applications development cycle.

These differing viewpoints on the same set of issues continue to create a barrier to productive communication between IS executives and top corporate management. In the natural order of things, it is unlikely that top management will become versed in the arcana of information technology. It is therefore incumbent upon the IS executive to adopt the language and viewpoint of the business executive.

Fried is vice president of information technology consulting at SRI International in Menlo Park, Calif., with responsibility for worldwide information technology consulting activities.

Why IS needs to watch AI

PAT HAYES

Ignoring artificial intelligence now is as disastrous as ignoring computers was back in the '50s.

AI is on the brink of a revolution. The technology is moving into mainstream applications, driven by an increasingly urgent need to deal with information overload.

Now that fiber-based networks make global interchange possible, data traffic in these electronic highways will soon be incredibly busy. For several reasons, AI is the key to making sense of all this information.

First, data is too voluminous and scattered to be accessible by traditional methods. Second, expert human resources are spread thin and often unavailable. Third, systems are becoming too complex for traditional computing to handle. As more managers get involved with computers, they'll demand the natural language interfaces AI offers.

AI systems should be thought of as amplifiers of human talents. They "think" in the same way humans do and can communicate in human terms. They are a new kind of assistant that can put a variety of resources at users' fingertips.

Catching on

As companies discover the value of AI, they are rapidly integrating it into traditional computing environments. For example, an AI kernel is embedded in thousands of lines of Cobol code in Ford Motor Co.'s Escape system same-day warranty claims verification. The system helps the company keep up with constant changes in warranty claims and responds quickly to customer requests.

Other companies are integrating AI into crucial business procedures such as expense account auditing, maintenance and production scheduling and customer service.

In addition to being integrated into traditional systems, AI technologies are being integrated with other similar technologies, including expert systems, flexible reasoning, neural networks, fuzzy logic, probabilistic reasoning, case-based reasoning, natural language, machine vision and robotics.

IS managers who understand AI can make the best use of current and future problem-solving capabilities. Those who are blind to AI's importance, however, will be left in the dust.

Hayes is president of the American Association for Artificial Intelligence.

Transforming an industry than just

It takes more than good looks to make the most of personal computing. While OS/2® features the kind of user-friendly, graphical environment that's a big part of where the personal computing industry is heading, there's much more to OS/2 than meets the eye.

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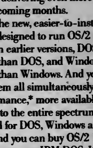

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COMMENTARY

Rosemary Hamilton

Guide stays loyal to IBM

Guide International, the IBM large-systems user group, isn't exactly outspoken. Toss out a topic for a comment, and no matter how controversial or trendy it may be, you'll get a low-key and diplomatic response.

A recent interview with the current president, Ben Parke, was right in step with this approach. At a time when most industry analysts and observers are raising big concerns over IBM and its large-systems business, Parke said he has confidence in the company and expects it to continue to deliver products and services to the Guide membership.

Now Parke himself pointed out that it is in Guide's "best interest" to see IBM do well. With that in mind, who would expect him to criticise the company? However, he also said that his current position stems from keeping IBM in perspective. Speaking for Guide members, Parke said he prefers to look at the longer term picture. And when he does, he doesn't see cause for the alarm that others have expressed. Instead, he suggested that IBM has taken so much heat lately because "they are so big and so visible that any change generates publicity."

Skeptics would suggest that Parke and Guide wouldn't dare say anything negative and jeopardize what appears to be a good working relationship with IBM. However, let's look at IBM from

Continued on page 30

IBM's CSP code generator still on a roll

ANALYSIS

BY ROSEMARY HAMILTON
CW STAFF

IBM's Cross System Product (CSP) continues to gain momentum even though some users and industry analysts consider it far from top-notch.

In recent months, this mainframe code generator has reached a new level of legitimacy as third-party software companies announced either CSP support or add-on products. What is more, its very own user group was formed earlier this month, and last week an IBM executive promised more CSP enhancements will be announced later this year to underscore the company's commitment to the product.

Despite this flurry of activity, the software continues in an oddball role. It now commands a considerable lead over competing fourth-generation languages and code generators in a user poll of buying intentions, yet it gets a lukewarm reception from users. While opinions have clearly improved, users contacted recently said IBM could do still more to make CSP a better product.

Industry analysts said IBM has taken several steps to improve the software. However, they also said it is more IBM's positioning of CSP than the product's functionality that is putting CSP on the buy list of large IBM shops. Most notable was IBM's move to make CSP the crowned generator of choice for its strategic applications development environment, AD/Cycle. The company has also closely positioned CSP with DB2.

"The reason it's selling is because it's a key piece of AD/Cycle," said Vaughan Merlyn, a partner at the Center for Information Technology, a division of Ernst & Young. "From a marketing perspective, CSP is hot. So the number of licenses is increasing."

A year ago, Jim Matsey, head of information systems at Reynolds Metals Co., said his company would use CSP even though some of his users thought it was a dud. Last week, Matsey said, "We are still using it, and I'm not sure the opinions have changed much."

IBM has acknowledged CSP's reputation in the past and last week said it is focused on restructuring the product to make it a first-class code generator. Chris Wicher, a product area manager for applications generators at IBM, said the company

Continued on page 30

	88	89	90
Computer Associates International, Inc.*	12%	14%	14%
Cincom Systems, Inc. (Mantis)	4%	4%	2%
IBM (CSP)	34%	39%	39%
Panaophic Systems, Inc. (Telon and Gener/OL)	17%	12%	10%
Software AG of North America, Inc. (Natural)	12%	12%	16%
Other	21%	19%	19%

*[illegible]

Source: Computer Intelligence

CW Chart: Janell Genovese

Federal studies say Ada bests C++

DOD's chosen programming language wins in almost every category

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — The U.S. Department of Defense (DOD) has released the results of four recent studies showing that the DOD-mandated programming language Ada is superior in a variety of ways to its newer rival C++. The studies suggest that "there are no compelling reasons to waive the Ada requirement [in favor of] C++," the Pentagon said.

A fifth study went beyond a look at the third-generation, object-oriented languages and said the use of fourth-generation languages (4GL) with good development environments and methodologies can boost software productivity by a factor of 10.

The studies generally found that Ada is more mature than C++, is more standardized, is supported by more vendors and is accompanied by a richer set of development tools. A TRW, Inc. study said that Ada is about three years ahead of C++.

TRW found that Ada now offers a 35% cost advantage in development and 70% in maintenance over C++. After 1994, TRW said, those figures may erode to 10% and 30%. However, TRW said C++ rated better than Ada in compilation and runtime efficiency and support for object-oriented design.

Carnegie Mellon University's Software Engineering Institute used a language-evaluation methodology developed by IBM in the mid-1980s and concluded that Ada was 23% better than C++ in six categories.

Productivity advantage

CTA, Inc. looked at the productivity of the two languages based on actual projects and found Ada programmers on average produced 210 source lines of code per month while C++ programmers turned out 187 lines.

CTA also found an average of 24 errors per 1,000 lines of Ada code vs. 31 errors for C++. CTA said that normalizing the data to account for different project sizes indicated a 35% productivity advantage for Ada.

A Naval Postgraduate School report said language selection, training and computer-aided software engineering tools can improve productivity modestly, but it said "a fundamental change in the software development paradigm will be necessary to achieve an order-of-magnitude gain." The school said that boosts in productivity can be had from the use of a 4GL provided it is accompanied by "a productive development environment, an evolutionary implementation methodology and well-trained development teams."

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David V. Evans
Vice President
Director, Information Systems
J.C. Penney

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Mark Quinlan
Senior Programmer/Analyst
Huntington National Bank

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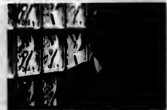
John Pajak
Executive Vice President
Mass Mutual Life Insurance

"The strengths of the IEF are clear-cut. One obvious quality advantage is that application changes are made to diagrams, not code. This ensures ongoing integrity—the specification always matches the executing system."

Paul R. Hessinger
Chief Technology Officer
Computer Task Group



"I've seen other CASE tools fail, so I raised the bar high when we evaluated the IEF. It passed with flying colors. I could not be happier with my decision to adopt the IEF company-wide."

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Venkat (Vinnie) Tiruvilmala
Director, CPC/CPPC Information Systems
SONY Corporation

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Mogens Sorensen
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Nykredit (Denmark)

op information systems with uctivity and maintainability.

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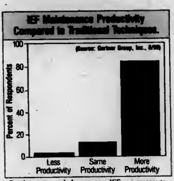
The quality of IEF-developed systems is remarkable. In recent CASE research by The Gartner Group, application developers were asked to report the number of abends they had experienced. (An "abend" is a system failure or "lock-up" caused by code defects.) *IEF developers reported zero defects—not one abend had occurred in IEF-generated code.*

Maintenance productivity gains of up to 10-to-1.

In this same study, developers were asked to compare IEF maintenance productivity with their former methods. Of those responding, *more than 80 percent had experienced gains of from 2-to-1 to 10-to-1.* (See chart.)

Specifications always match the executing application.

With the IEF, application changes are made to diagrams, not code. So, for the life of your system, specifications will always match the executing application. The Gartner Group research showed that *all* IEF users who reported making application changes made *all* changes at the diagram level.



Developers were asked to compare IEF maintenance to former methods. Of those responding, more than 80% reported productivity gains of from 2-to-1 to 10-to-1.

Mainframe applications can be developed and tested on a PC.

With our new OS/2 toolset, you can develop mainframe applications, from analysis through automatic code generation, on your PC. Then, using the IEF's TP monitor simulator and the diagram-level testing feature, you can also test these mainframe applications without ever leaving the PC.

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We are committed to standards.

IEF tools and IEF-generated code will comply with standards as they emerge. We will adhere to CUA standards and to the principles of IBM's AD/Cycle and DEC's COHESION—and we will support Open Systems environments centering around UNIX. In any environment, the COBOL, C and SQL we generate adhere closely to ANSI standards. Our presence on standards committees helps us keep abreast of ANSI and ISO developments affecting the CASE world.

Full-service support.

Of course, our technical support, consultancy, training courses, satellite seminars, and other informational assistance will continue apace. We also offer re-engineering and template services. This full-service support will remain an integral part of the IEF product.

For more information
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IDC Study on UNIX OLTP

UNIX On-Line Transaction Processing at Multi-User UNIX Sites (January 1991) states that some 47.4% of sites running commercial applications on multi-user UNIX systems are running OLTP. The study reports that Informix is in use at more sites than any other DBMS for UNIX OLTP applications.

About the TPC

The Transaction Processing Performance Council (TPC) was founded in 1988 to define transaction processing benchmarks and to provide performance data to the industry. Today, 40 hardware and software vendors, including AT&T, Bull, Sybase, Data General, DEC, ASK/Ingres, Fujitsu, IBM, Informix, Hewlett-Packard, NCR, Olivetti, Oracle, Pyramid, Sequent, Siemens, Sun, and Unisys are members.

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The TP1 benchmark is no longer the accepted benchmark for measuring database performance. The new TPC tests establish more complete, thorough specifications than TP1, leading to more objective, verifiable results for comparing performance between hardware systems and software products. TPC Benchmark™ A measures OLTP processing performance. TPC Benchmark™ B—similar to a batch test—focuses on database throughput.

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Lightning drives truckers from LAN

ON SITE

BY MICHAEL FITZGERALD
CW STAFF

GRAIN VALLEY, Mo. — Inflexibility and a lightning bolt had the Owner-Operator Independent Drivers Association (OOIDA) singing the local-area network blues. As a result, the association dropped the LAN for an IBM Application System/400 and now sings a happier song.

The OOIDA represents some 14,000 members, all of whom own and drive large trucks. In 1985, the OOIDA moved off stand-alone personal computers to LANs, in part to manage a wildly successful self-insurance program for the drivers. The nonprofit OOIDA later split its insurance side into a separate, for-profit branch.

By 1987, the association had three separate LANs running in its facilities: a 12-station LAN for the insurance side, a two-person LAN for its *Landline* magazine and a three-person LAN for the membership group.

Demand for insurance has helped drive growth from five employees to 69. But LAN performance suffered on the insurance side, which was supported by a value-added reseller-configured file server with 4M bytes of random-access memory and a 240M-byte hard drive. That 12-workstation system had to handle some 250,000 transaction histories for 7,000 insurance policies.

"It was extremely slow — each day's receivables took about four hours to run if there were no problems," said Brenda Hargis, data processing manager for the OOIDA, adding that production reports generally required an entire night to run. Eventually, the OOIDA switched from Software Link, Inc.'s Multilink networking operating system to Novell, Inc.'s Netware 286.

A striking event

Then lightning struck, literally, in October 1988. The bolt blasted the customer transaction data at the OOIDA. Hargis had always made two sets of backups, so she was not worried about the lost data, until it turned out that the backup system had the wrong tape density and little data could be recovered.

Fortunately for the OOIDA, Hargis is a self-described pack rat who had saved copies of the paper transactions. Still, the files had to be recreated, a painstaking and stressful process.

OOIDA's Hargis *switched to the AS/400 for greater flexibility*

Partly because of this disaster, the OOIDA opted to hire an outside contractor to create its software. The association also began to look seriously into moving away from the LAN.

"The network would not allow us the growth and flexibility we need," Hargis said. Hargis pointed to the association's need to run various programs that benefit its customers, among them a commercial driver's licensing program, a drug-testing consortium and a fuel-purchasing program.

"We needed something that would accommodate all these packages, and they've grown, so we went to the AS/400" in April 1989, Hargis said. She found benefits aplenty. For instance, the LAN would go down two to three times a month, while the AS/400 has been down less than 24 hours in two years.

Today, all 69 OOIDA employees can access the AS/400 Model 9406 B35, which has 40M bytes of RAM and 1.4G bytes of hard disk. A Toshiba Corp. 9347 tape drive backs up the system, and the OOIDA, although hoping lightning will not strike twice, has invested in an uninterruptible power supply as well.

In June, the OOIDA put its insurance agents on the AS/400, and Hargis said this has slowed down processing considerably and boosted processor use to 96% capacity.

The OOIDA uses an outside consulting firm to provide its software. The consultant serves as software analyst and designer and writes code with the association's in-house programmer.

Cost concerns

The AS/400 "is slightly more expensive" than the LAN was, Hargis acknowledged, but "with the little quirks we need as an association, it gives us more flexibility. When you go with canned software, you get what you pay for and nothing else . . . Now, we don't have that worry."

Hargis said the AS/400 has hit some sour notes. "You are dependent on IBM, and . . . I feel like you have to call four or five times to get just a manual or program temporary fixes."

Hargis said she also thinks IBM pays little attention to the OOIDA's service needs.

She speculated that IBM service is less than stellar because of the fact that the OOIDA is not a large user and added that she does not think the OOIDA's purchase of its AS/400 through disfranchised IBM remarketer XL/Datacomp, Inc. has damaged her ability to get service.

HP minis unsnarl Unisource tangles

BY J. A. SAVAGE
CW STAFF

SAN FRANCISCO — In using large Hewlett-Packard Co. minicomputers to assist and perhaps someday even replace the company mainframe, Richard Hrapczynski Jr., vice president of MIS at The Unisource Corp., is finding that while the hardware can certainly keep up, the software is still a bit of a bottleneck.

While trying to persuade software vendors to port their products to faster machines serving larger sites, Unisource is getting around the bottleneck by using its own programmers for short-term fixes. As a growing company, Unisource has suffered from using software originally designed for smaller businesses.

Unisource distributes paper products — from rolls of printing paper to shopping bags — to 45 West Coast locations for further local distribution.

At its main computer site here, the day's sales data is fed into a Bull HN Information Systems, Inc. DPS 8000/40 mainframe, and each night, the mainframe recommends the next day's buying schedule to three divisions: one here, one in Seattle and the third in Los Angeles. Each division has an HP minicomputer.

"If everything goes right, when the staff comes in in the morning, it should be sitting on their printers," Hrapczynski said.

Large HP minicomputers — two HP 3000 Model 960s and one 980 — were bought during the last year. Unisource was formed by the merger of Carpenter/Offutt and Blake, Moffitt & Towne in 1985, with the mainframe being inherited from Blake, Moffitt & Towne. From Carpenter/Offutt, Unisource got an HP 3000 Model 70.

"We took the best of both worlds," Hrapczynski said. "Bull at that time had no on-line capability." So, the HP machine was upgraded in a big jump to the current models that are used for orders, routing and inventory. Analysis is done in batch mode on the mainframe.

The on-line capability was critical to the company because most orders are called in between 3 p.m. and 5 p.m., and the firm provides next-day delivery.

The company has had HP's large minicomputers (rated by HP at 15 million instructions per second for up to 600 users) for about one year. "With the RISC architecture, HP finally got to the big boys' world, where they can compete with mainframes. But a lot of software written by independent vendors was built for smaller companies," Hrapczynski said.

For instance, an application that was able to handle millions of dollars should now be able to handle hundreds of millions of dollars.

Finding a solution

To help circumvent the software bottleneck, Hrapczynski's programmers take existing programs such as databases and, using fourth-generation language tools such as Speedware from Infocentre Corp. in Montreal, rework them by building software preprocessors to support a larger computing environment.

Hrapczynski said he has urged his software vendors to expand their products' infrastructure to fit the new minicomputers that are as fast as mainframes. "These products were built for smaller companies. A general ledger system will have two location fields, which would handle 99 locations. But bigger companies have many more sites than that."

Unisource is in the process of automating its last divisions in Alaska. When installations of their dumb terminals and printers connected to the HP computers are completed, the company will examine whether to acquire a new mainframe or some other configuration as a host. But Hrapczynski has yet to make any decisions on direction. He said he expects a decision to be made in the next three years.

IPL 8mm tape subsystems offer an alternative to IBM

BY MARYFRAN JOHNSON
CW STAFF

WALTHAM, Mass. — IPL Systems, Inc. recently introduced four high-capacity 8mm tape subsystems for the Application System/400, touting the tape drives' capabilities in unattended backup and their compatibility with the new AS/400 D models.

The price and performance of the IPL 6700 series grabbed the attention of users such as Jim Beaucaire, systems manager at Computer Telephone Corp. here. A network services vendor for the regional Bell operating companies, Computer Telephone was a beta-test site for IPL's 6765 tape subsystem, which stores a maximum of 10G bytes of compressed data in a single-drive configuration.

The low-end IPL 6750 stores up to 2.5G bytes of uncompressed data or 5G bytes of compressed data on a single 8mm cartridge.

The four IPL drives in the 6700 series are available in dual-drive as well as single-drive or low-density configurations. They will be generally available through IPL distributors next month at suggested list prices from $6,000 to $20,000.

Beaucaire estimated that the IPL drive is saving his firm the cost of a second-shift operator at night because the unattended backup eliminates the need for an operator on the job when data is downloaded at 8:30 p.m. from the company's California office. The IPL drive runs in conjunction with an IBM 9347 tape drive on an AS/400 B70 at the firm's headquarters here.

The midrange system handles all corporate and financial applications but is used primarily as a management tool for salespeople to generate leads and track customers, Beaucaire said.

Easy choice

"We ended up with IPL because the 8mm device was not available from IBM until recently," Beaucaire said.

IBM introduced its 8mm offering for the AS/400 in April with the 7208 drive, which stores up to 2.3G bytes of uncompressed data.

The 7208 has a list price of $7,100 but attaches only to the new D models, while competitors such as IPL can provide 8mm gear for all AS/400 models, analysts noted.

Bob Callery, an analyst at Technology Investment Strategies Corp. in Framingham, Mass., pointed out that because Exabyte Corp. is the sole source of 8mm tape drives now, IBM and its competitors are all dealing with the same technology.

IBM's CSP

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will be unveiling a number of enhancements, although he could not provide introduction dates. However, he did say the company will provide a CSP function to generate Cobol code for an IBM CICS environment this year.

"It's an incredibly high-priority requirement," Wicher said of the CICS piece. "You can expect that this year."

He said a full workstation environment for CSP is another high priority. Currently, mainframe CSP users can download a portion of CSP for workstation analysis, but it does not provide a full test environment.

Lastly, he indicated that IBM would map out its direction for a CSP cooperative processing development that would include OS/2 later this year.

One IBM customer recently found a way to make CSP better through the use of one of the new CSP add-on tools. Diamond Shamrock Refining and Marketing, Inc., which operates gas stations in the South, installed CSP last year as part of its move to DB2. More recently, the company beta-tested a CSP add-on tool from K-C Computer Services, Inc. and has made significant progress with CSP as a result, according to Crystal Miller, a lead analyst in Diamond Shamrock's applications development department.

K-C's CSP/Application Development Enabler tool provides users with standard program models that provide basic code that can be modified. The idea is to reduce the amount of actual coding and, as an add-on to CSP, limit direct involvement with the IBM product.

At Diamond Shamrock, the tool is still in test mode, but Miller said one application written in CSP with the K-C product is already in production. "I would say it has greatly improved CSP," Miller noted.

Hamilton

FROM PAGE 25

his perspective. Looking at this longer term picture, Parke made these observations on recent industry trends and IBM events:

- **Downsizing will be a blow to IBM's mainframe business.** Parke said this is an exaggerated claim. He suggested that the downsizing trend has "been in the press far more than there are actual implementations." While he has seen some companies downsize their operations, he knows of many others, including his own company, where it would just not be a practical solution at this point. While he expects more companies will downsize in the future, he does not see it as a major trend for the near term.
- **Mainframes are on their way out.** The Guide president dismissed this, saying, "I can say the mainframe is not going away. I can tell you that. Not in the 1990s." Parke used his own company as an example. Burlington Industries relies on a 3090 and at this juncture is invested in "thousands of [mainframe] applications." He said the cost of any conversion — to a smaller platform or not — would be "astronomical."
- **IBM's Systems Application Architecture is a disappointment.** Not true, according to Parke. While it is clear that SAA as originally defined is not yet reality, Parke judged its success on the real benefits, however small, that users have received. Common User Acccess, which is only a piece of SAA, has provided users with tremendous improvements in applications usage, he said. On that basis alone, Guide considers SAA a success.
- **The Officevision delays were a big setback for IBM and raised doubts about its ability to deliver on the big SAA initiatives.** Parke said Guide obviously wanted IBM to meet its deadlines with this strategic office platform. However, he said, the setback should not be interpreted to mean anything more than typical software delays. "It simply says IBM underestimated how long it would take," Parke said. "We've all done that."

Hamilton is a *Computerworld* senior editor, systems and software.

If You Really Want To Change The World, You Have To Work From The Inside.

Oracle, NCube break speed barrier

BY JEAN S. BOZMAN
CW STAFF

REDWOOD CITY, Calif. — Oracle Corp. software engineers have managed to push the Oracle Version 6.2 "parallel server" database engine beyond the 1,000-transaction-per-second barrier, but they did it only with the help of a 64-processor NCube Corp. supercomputer.

The benchmark, completed this month, peaked at 1,073 trans./sec., compared with 300 to 400 trans./sec. for Oracle 6.2 running on a four-computer Digital Equipment Corp. Vaxcluster. The benchmark, audited by Tom Sawyer, president of Performance Metrics, Inc. in San Jose, Calif., was done according to standard TPC-B benchmark conditions, Oracle said.

"It is an impressive number," commented Sawyer, who has conducted TPC-B tests on other database management systems. "We can safely say that it is twice as high as any other TPC-B number announced so far. But TPC-B gives you a number that you'll basically never reach online in the real world."

But Oracle's high-speed test on the NCube machine, which has largely been sold into scientific and technical sites, may not spell relief for most commercial users, even for use as a back-end dedicated database machine.

"The problem with this type of benchmark is that it will look at the CPU-intensive part of the job, where massively parallel systems have done well, but not at the I/O-intensive part of it, which typically is the important part for end users," said Christopher Willard, a senior industry analyst at Dataquest, Inc. in San Jose.

The Oracle database ran on a dedicated NCube machine. The NCube's Vertex operating system was not altered prior to running the benchmark, Oracle said.

The TPC-B test simulated the actions of 860 users and achieved a 0.6-sec. response time, Oracle said. The size of the database tested was 70G bytes, he added. Oracle 6.2 was announced in March, allowing the Oracle relational database management system to run on loosely coupled processors or parallel processors [CW, March 25]. The revised Oracle software was developed to solve performance problems caused by Oracle 6.0 running on multiprocessor DEC Vaxclusters.

"It may be worth a little bragging rights, but that's about it," said Charles Phillips, a senior analyst at Soundview Financial Group, Inc. in Stamford, Conn. "Very few people are going to buy an NCube system running Oracle right away because it's too expensive." A typical NCube starter computer might cost $1 million to $2 million, he said.

Oracle managers admitted that for now, the NCube test will not affect most commercial sites.

Sales strategy

Oracle plans to have an early support program with selected customers, including full-time Oracle engineering support for the next nine to 12 months before announcing a date for general availability of the NCube machine running Oracle 6.2. Target sites would include airlines, telecommunications companies and financial institutions, all of which have high-capacity transaction-processing requirements, Oracle said.

Parallel processors made by Meiko Scientific Corp. in Boston may also run Oracle 6.2 by the end of the year; Meiko machines are based on multiple Intel I860 reduced instruction set computing chips.

Other computers will eventually run Oracle 6.2, including those made by Parsys Ltd. in London, Sequent Computer Systems, Inc. in Beaverton, Ore., and Pyramid Technology Corp. in Mountain View, Calif.

IBM Selects GOAL As A

[redacted]

On June 25th Goal became a SystemView development partner. Working with SystemView partners and customers Goal will help to shape the world of Automated Systems Management. For our customers this leadership position means they'll not only continue to gain the advantages of GOALPLEX – the most integrated family of Automated Systems Management products available – but will be perfectly positioned to reap the future benefits of SystemView.

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FAQS™/ASO for VSE
FAQS™/PCS
EPIC™/VSE
EPIC™/CMS
EPIC™/MVS

OS/2 for Natural scores high with 4GL users

BY JOHANNA AMBROSIO
CW STAFF

Users of the OS/2 version of the Natural fourth-generation language give it high marks, although not many customers are doing production development work with it yet.

Natural OS/2 was recently made available by Software AG of North America, Inc. in Reston, Va. Applications developed with the OS/2 version are fully source-compatible with Natural programs developed on mainframes, the company said.

Also, software developed with Natural OS/2 can be migrated to other platforms, including those from IBM, Digital Equipment Corp. and Wang Laboratories, Inc.

Larry Lammers, project manager for container systems at Inland Container Corp. in Indianapolis, said his firm is installing Natural OS/2 as part of its drive to make Natural the corporatewide development standard by 1993. "We will have to understand only one set of languages, and the applications we develop will run across all our platforms," he said.

Successful test

Lammers said that at the moment, "we've just ported a mainframe Natural application down to Natural OS/2 to see if it runs on the PC, and it does." The application will probably be ported onto a network of personal computers, which are used in 40 plants around the country, Lammer said. The firm also plans to use Natural on DEC VAX computers in its paper mills.

Another customer, Rochester Gas & Electric Corp., is using Natural OS/2 to back up its mainframe Natural systems. "We download data about once a week and have ported about 100 programs to the PC," said Lee Faull, lead analyst. "And except for the color on the PC, there are really no differences. It works well."

He said that the company has had to modify about three of the 100 programs to rectify differences caused by various releases of Natural. By the end of the year, Faull added, Rochester Gas & Electric will be developing production applications on Natural OS/2. "We're putting in a Token Ring LAN and will develop tool-control and bar-code-control applications," he said.

Natural OS/2 is available as a single-user version or for local-area networks, including Novell, Inc. Netware and any networks supporting IBM Netbios. License fees range from $300 to $1,000 per user.

[illegible]

[illegible]

Digital [illegible] $30 million [illegible] years. DEC will provide London-based Olivetti Systems and Networks with DEC's VT630 text terminals, modified to Olivetti's specifications.

NEW PRODUCTS — SOFTWARE

Applications packages

Design Consultants, Inc. has extended its Starpro project management software with a new module, Starpro/Text.

Starpro/Text includes a word processor from Trax Softworks, Inc. and integrates project-related documents, including proposals, reports and training manuals into Starpro. It also allows users to create employee performance reports.

Starpro/Text runs on mainframes under CICS and TSO.

Pricing ranges from $5,000 to $12,700, depending on number of users.

Design Consultants
Suite 204
100 Progress Pkwy.
St. Louis, Mo. 63043
(314) 434-5750

Specialized Software International, Inc. has announced availability of Release 3.6 of its Tables Management System.

The system comprises table definition, table maintenance and memory-resident table inquiry components and runs under CICS and IBM's IMS/DC.

Pricing ranges from $15,000 to $45,000.

Specialized Software International
90 Madison St.
Worcester, Mass. 01608
(508) 753-0909

Britz Publishing, Inc. has announced Days Release 3.0, an upgraded calendar and scheduling software package for IBM midrange computers.

Release 3.0 includes enhanced control over printed schedules. Lists can be selected for designated companies, departments and individual employees.

The version for the IBM Application System/400 has also been rewritten specifically for that platform.

Days 3.0 costs $99, including source code. A free 30-day evaluation period is offered.

Brits Publishing
Suite 1-A
986 Madison Ave.
Madison, Miss. 39110
(601) 853-1394

Database management systems

Intelligenceware, Inc. has announced DBS:Database Supervisor, a software utility for detecting data anomalies in large databases.

The product detects irregularities according to user description and its own internal pattern-recognition algorithms. Reports are generated automatically on detection of abnormal data patterns.

DBS:Database Supervisor is available for Digital Equipment Corp. VAX/VMS systems at a price of $7,500.

It is also offered on Teradata Corp. database computers starting at $10,000 and on personal computers for $490.

Intelligenceware
5933 W. Century Blvd.
Los Angeles, Calif. 90045
(213) 216-6177

Languages

Chez Scheme Version 4.0, a high-performance implementation of the Scheme dialect of LISP, has been released by Cadence Research Systems.

The updated version includes an improved optimizing compiler and redesigned storage management system, the company reported. Debugging procedures have also been simplified.

Chez Scheme 4.0 is available on Digital Equipment Corp. VAX and Decstation systems, Sun Microsystems, Inc. workstations and other platforms.

Pricing for Chez Scheme on a single central processor is $2,000. Discounts are offered for multiple CPU licensing and for educational institutions.

Cadence Research Systems
M/S 2000
620 Park Ridge Road
Bloomington, Ind. 47408
(812) 333-9269

Unix

Xtree Co. has announced Xtree for Unix, an integrated collection of disk and file management utilities for multiuser Unix environments.

Xtree for Unix provides single-keystroke alternatives for Unix file management commands. It recognizes special Unix console and keyboard functions and offers user-definable system information displays, according to the company.

The product costs $295.

Xtree
4330 Santa Fe Road
San Luis Obispo, Calif.
93401
(805) 541-0604

Dialogue, Inc. has ported its Access Executive software to the Unix platform.

Access Executive provides database management for sales and marketing purposes in retail environments. It offers ad hoc querying through a menu system and standard reporting capabilities.

The Unix version costs between $10,000 and $175,000, based on hardware platform.

Dialogue
19 Rector St.
New York, N.Y. 10006
(212) 425-2665

HARDWARE

Processors

RGB Technology, Inc. has developed the Imageboss 2000, a graphics presentation workstation.

The system, built around the Motorola, Inc. 68030 processor, simultaneously controls up to four independent presentation displays with high resolution and 24-bit color, according to the vendor.

It includes built-in live video and frame-grabbing facilities and can import file formats used by systems from Apple Computer, Inc., Sun Microsystems, Inc. and Digital Equipment Corp.

The Imageboss is priced at $34,999.

RGB Technology
6862 Elm St.
McLean, Va. 22101
(703) 556-0667

I/O devices

Specialix, Inc. has announced Rio, an intelligent I/O controller for Unix systems with up to 512 users.

Each Rio Host Card sustains data throughput rates of 57.6K bit/sec. for up to 128 users without degradation, the company reported. Rio Remote Terminal Adapters (RTA) link to the host through four 10M bit/sec. data channels and can be located up to 250 ft from the host.

The Rio system is available for IBM Personal Computer XT/AT, Micro Channel Architecture and Extended Industry Standard Architecture PCs.

Host Cards are priced at $795. Eight-port RTAs cost $800.

Specialix
Suite 12
985 University Ave.
Los Gatos, Calif. 95030
(408) 354-4498

Xpoint Corp. has announced the XP/2400, a laser printer for direct twin-axial connection to IBM midrange computers.

The XP/2400 offers 24 page/min. output for IBM System/36s, 38s and Application System/400s. The company reported a rated duty cycle of 120,000 print/month. Multiple fonts and 300 by 300 dot/in. resolution are supported.

The printer costs $15,500. A duplex version costs $20,500.

Xpoint
Suite 370
3100 Medlock Bridge Road
Norcross, Ga. 30071
(404) 446-2764

Power supplies

EPE Technologies, Inc. has added a 750-kVA uninterruptible power system to its System 4000 line for mainframe computers.

The power unit has a 93% efficiency rating and can be connected in parallel or stand-alone redundant systems for additional protection.

The system costs $187,000.

EPE Technologies
1660 Scenic Ave.
Costa Mesa, Calif. 92626
(714) 557-1636

COMMENTARY

Michael Fitzgerald

Are you on the SPA's list?

Recently, I participated in a radio show about the Software Publishers Association (SPA) and its efforts to stop illegal copying of PC software. Most of it was uneventful, until a man named Bill called and started firing angry questions at the SPA's director of litigation, mostly along the lines of, "Do we now have to worry about the police knocking on our doors in a brash and obnoxious invasion of the privacy of a private company?"

Bluebeard lives, me hearties!

Bluebeard Bill seems to lack a crew for his privateer, though, at least among IS managers. Even off the record, IS types refuse to call the SPA out of line. In fact, the average IS manager seems to see the SPA as an ally in the fight to get their bosses and fellow employees to understand that copying software is a serious offense.

Bill based his argument on the analogy of videotaping movies. "You don't see the movie industry banging on my neighbor's door because he copies movies," Bill said. Ah, but they could if the neighbor decided to copy a tape and give it to a friend. Copying a movie or a TV show,

Continued on page 39

IBM reworking desktop tack

BY MICHAEL FITZGERALD
CW STAFF

As head of both personal computer hardware and software for IBM, which includes the RISC System/6000, James Cannavino is in the hot seat. IBM has lost PC market share this year as its premium prices put it at odds with what is fast becoming a commodity marketplace.

"Computers will become as disposable as other commodity products, but this whole thing isn't settling into a commodity market," Cannavino said recently. "You compare it to the [Sony Walkman], and I would not say that, but if I did, I would not at the same time declare that everybody will use a Walkman."

He said that with the Walkman analogy in mind, IBM will compete at both the high and the low ends of the PC market.

"There will be tremendous value-add that will carry premium prices" — among other things, digital video interactive and multimedia.

Cannavino said IBM is prepared to compete in the PC hardware market because of what he calls "the luxury" of being a developer of technology, subsystems and products. He also said a restructuring has eliminated IBM's notoriously slow product development cycle.

"You'll see us deliver product start to finish in a shorter cycle," he promised. "We'll be first to market in any reasonable sense of production in the technologies. I don't want to be as late in the future as I was in laptops."

John Martel

IBM's Cannavino, *as head of PC hardware and software, faces changing market realities*

As for PC software, where IBM is notably late even with strategic products such as OS/2, Cannavino freely admitted the company was overly optimistic in its delivery schedules. Still, he made bold predictions about OS/2's future, despite the seeming shift away from it represented by IBM's recent alliance with Apple Computer, Inc.

"OS/2 is going to be the most successful operating system ever shipped, as a material benefit to business," Cannavino stated to *Computerworld.*

Cannavino said he bases his optimism on the increasing power of PC hardware and the belief that a good 32-bit operating system will spawn new types of software that will take the user beyond spreadsheets and word processors.

"You've got to be able to take the next statement of that problem, and OS/2 is the platform that lets you do that, so it's got a real reason to exist," Cannavino said.

He added that the possibilities of this future have led IBM to form its alliances. "We had to come up with some partners that shared the same vision. Microsoft was one of them, for a while; then they kind of had a different vision. It's their opportunity to do that," said Cannavino, who noted, "Microsoft, incidentally, is the leading supplier of OS/2 applications, so it's not like they've abandoned their bets on it."

Users can choose between two 32-bit DOS extenders

BY PATRICIA KEEFE
CW STAFF

Following two recent introductions, users can now choose between two 32-bit DOS extenders with DOS Protected Mode Interface (DPMI) standard support for Intel Corp. 80386 and I486 systems.

Phar Lap Software, Inc. in Cambridge, Mass., recently announced support for DPMI, as well as Microsoft Corp.'s Windows 3.0 and DOS 5.0, under Version 4.0 of its 386/DOS-Extender. Neighbor Rational Systems, Inc. in Natick, Mass., also unwrapped a DOS extender for 386/486 architectures — DOS/4G — along with two other products.

Support for XMS, VCPI

Both vendors will continue to support XMS and the older Virtual Control Program Interface standard, which allows Extended-DOS applications to work with extended memory system emulators such as Qualitas, Inc.'s QEMM and Quarterdeck Office Systems' Desqview.

Phar Lap's 386/DOS-Extender 4.0 reportedly will allow developers to build multimegabyte protected-mode applications for the Windows environment. Communications between Windows applications and Extended-DOS applications is provided via the Windows Clipboard, facilitating the exchange of graphics and text.

According to Phar Lap President Richard Smith, the long-term benefit of DPMI support is

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PC
MAGAZINE
EDITORS'
CHOICE

A few months ago, some guys came by and stuck this on our windows.

And they weren't just any guys, either.

They were a group of editors from *PC Magazine*, and in their February 26th, 1991 issue, they had some awfully nice things to say about IRMA™ WorkStation for Windows.

Best Windows 3.0
3270 Terminal Emulator:
IRMA WorkStation
for Windows v. 1.0.
Feb. 26, 1991.

Some comments:

"DCA®'s product is by far the most flexible that we've tested."

"Its flexibility, powerful scripting language, interface, and asynchronous abilities make it a top choice."

And, finally, "It's nice to see IRMA...out there again as the leader of the pack."

What did we do to deserve such plaudits?

In the Windows™ 3.0 operating environment, only IRMA WorkStation for Windows gives you a choice of single (CUT) or multiple (DFT) sessions via coaxial cable, remote SDLC or token-ring connections, as well as asynchronous connections.

Mainframe applications are easier to use because of our QuickHit™ and QuickPad™ features.

You also get 3270 terminal, 3270 printer and asynchronous terminal emulations, and an extensive range of 3270 and asynchronous file transfer protocols, including DCA's and IBM®'s.

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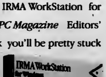
In order to experience the most feature-rich 3270 connectivity solution, just call, 1-800-348-DCA-1, ext: 78E and we'll have a free demo disk to you in no time.

And after checking out the capabilities that made IRMA WorkStation for Windows the *PC Magazine* Editors' Choice, we think you'll be pretty stuck on our windows yourself.

DCA



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Pen-based computing breaking through

Improvements in handwriting recognition and display technology will push pen-based shipments

BY JAMES DALY
CW STAFF

BURLINGAME, Calif. — Does Windows wow you? Still think the Macintosh is the most? You ain't seen nothing yet, according to several analysts who predict that within three years, pen-based computers will ripple though the industry like nothing that has come before.

"Pen-based computing promises to be the most important development ever in the computer industry," said Portia Isaacson, an analyst at Norwell, Mass.-based BIS Strategic Decisions, at the recent Pen Computing 1991, a one-day symposium sponsored by Technologic Partners.

Pen-based machines hold such promise because they will appeal to tens of millions of mobile professionals who currently do not use a computer but could benefit from one: stock clerks, insurance adjusters, field sales professionals, health services workers and construction workers.

Additionally, the electronic stylus will serve as the foundation of systems ranging from travel reference companions that display on-screen electronic maps to portable offices equipped with faxes and modems, analysts said.

Exploring new markets

"We'll create a new market because we appeal to a new class of user," said Bill Campbell, president of Foster City, Calif.-based Go Corp., which is producing a pen-based operating system called Penpoint.

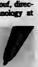
Improvements in handwriting recognition, display technology, durability and pricing will move pen-based computers from vertical markets into broader horizontal businesses. By 1995, International Data Corp. estimated, 850,000 pen systems will be sold per year.

Today, however, sales of pen systems are slow. Grid Systems Corp., one of only a handful of companies now shipping pen systems, sold only 10,000 machines in 1990, according to company President Alan Lefkof. That figure is expected to rise to 30,000 this year, he said.

Before many users are willing to commit to pen-based systems, however, some more work needs to be done, especially on compatibility. "We have every type of computing platform out there, so connectivity to other environments is very important," said Karen Athouf, director of advanced technology at American Express Co., which is considering arming stock traders with pen systems.

Write it off

With products just beginning to surface, pen-based computing should experience 100% growth rates although for a relatively small number of units



Projected shipments of pen-based computers
(U.S. figures)

Year	Units shipped
1991	30,000
1992	100,000
1993	250,000
1994	450,000- 500,000
1995	850,000

Source: International Data Corp. CW Chart: Janell Genovese

The user wish list includes a $3,000 price tag for an Intel Corp. 80386-based system with a high level of handwriting recognition, plenty of storage and a shock-resistant body.

When those needs are met, many users are expected to become excited about the prospect of the machines. "People look at pen-based machines and go, 'Wow — I've been in this industry for 21 years, and that's the first time I've heard that,' " said Norman Vincent, vice president of data processing at State Farm Mutual Automobile Insurance Co. The insurance giant is testing pen computers among its claim adjusters, who use them in making damage assessments.

Calls for a standard

Because of the market's enormous potential, a fierce struggle has begun to establish a de facto pen-based operating system standard. The chief competitors are Penpoint, a system built specifically for pen systems, and Microsoft Corp.'s DOS, which has the compatibility advantage.

Forrester Research, Inc. analyst William Bluestein predicted victory for Go. "Pen-based computing is an entirely different animal than desktop computing, and Penpoint was designed with this in mind from Day 1," he said.

Meanwhile, Microsoft is attempting "to force-fit Windows into a new role. Its success will be limited to users who want an electronic stylus as an adjunct to their desktop PC running Windows," Bluestein said.

Concerns are also mounting about Japanese vendors. Four pen computers from Japanese vendors are now shipping: two from Sony Corp. and one each from Sharp Corp. and Kyocera Corp. These machines are hand-held, consumer-oriented models that could present a serious onslaught to U.S. pen-based machines very shortly.

Currently, they are only available in Japan, but several are expected to be released in the U.S. at Comdex/Fall '91.

Expert system offers relief for child abuse

BY SALLY CUSACK
CW STAFF

INDIANAPOLIS — The Marion County Department of Public Welfare assigns 600 cases a month that involve some type of child abuse or neglect.

According to Jim Stewart, the department's child welfare assistant director, the nature of the department's work and low pay combine to create an 80% employee turnover rate each year. A single case could flow through six different people, subsequently creating a problem with consistency.

Now, technology has helped to alleviate this problem.

Marion County is using an expert system created by T. A. Roberts and Associates in Carmel, Ind. Running on standard Intel Corp. 80286- and 80386-based machines, the software relies on expert systems methodology to assist caseworkers in creating profiles and risk assessment.

Double duty

The Computer Assisted Risk Evaluation System (CARES) supports the caseworker in two stages of the evaluation process.

First, it estimates risk to a child from information received over a telephone hot line. The software prompts the interviewer to ask appropriate questions based on this information and subsequently recommends action to be taken.

Second, the program aids in evaluating risk and developing individualised education plans intended to modify the abusive behavior of the child's family.

The caseworker enters information gathered from the household, and then the caseworker and the computer each develop a risk-assessment rating. The two assessments must be resolved, which allows for minimum error.

Putting the family back together — if that is at all possible — is the main goal, Stewart said. This can involve counseling and educational and rehabilitative services; the program maintains and updates all available resources.

"The computer is also going to help us establish a floor for standardization," Stewart said. "We have 40,000 3- by 5-in. cards right outside my office, all containing prior histories of families we have processed. These will all be entered into the system."

Marion County began shopping around for a technology-assisted program two years ago and evaluated systems from IBM, Unisys Corp., Bull HN Information Systems, Inc. and several other vendors.

"To put it bluntly, the stumbling block was money," Stewart said. "Then Tom Roberts, at T. A. Roberts and Associates, saw our feasibility study and said he had a proposal."

Runs on DOS

CARES does not require specialised hardware platforms and runs on any DOS-based Intel 80286- or 80386-based system with 1M byte of memory. The application is modular, and the software design is straightforward: The Inference Engine is written in LISP, with the user interface constructed in Pascal.

"The greatest benefit I see with the technology is in profile development," Stewart said. "Right now, we operate primarily in a reactive mode, after abuse or neglect has occurred. By automating these profiles, hopefully we can do more preventative care."

CARES will be implemented statewide over the course of the next 12 months.

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No-frills Venture 16-386SX practical choice

Technology Analysis — a roundup of expert opinions about new products. Summaries written by free-lance writer Susanne Weisel.

Advanced Logic Research, Inc.'s Venture 16-386SX Notebook provides users with the basics of personal computing but not the bells and whistles. It is a well-designed, compact unit that offers solid performance at a reasonable price.

Performance: The Venture's 16-MHz engine is quite capable, reviewers said, but the 1M byte of standard random-access memory is only expandable to 5M bytes.

Ease of use: The backlit LCD display is small at just under 8½ in. diagonally, but it is sharp and readable. The keyboard has a good touch.

Design: The personal computer is well-built with large hinges and tight latches, reviewers said. It weighs a substantial 7 pounds 12 ounces, but it is only 12½ by 8.6 by 2.1 in.

Power supply: The battery lasts about 2½ hours, and it takes about three hours to recharge. The power adapter does not indicate when charging is complete.

Value: Despite some minor flaws, the comfortable keyboard and fairly low price make the Venture 16-386SX a good buy. It costs $2,395 with a 20M-byte hard drive and $2,795 with a 60M-byte hard drive.

Advanced Logic Research, Inc.'s Venture 16-386SX Notebook

Reviews	Performance	Ease of use	Design	Power supply	Value	Overall
Byte 6/91	Upper bracket	Easy on the eyes	Slightly bigger	Not enough warning on low power	One of best expansion	Nearly a top contender
Infoworld 3/4/91	Good	Good	Good	Good	Very good	6.3*
PC World 5/91	Good	Keyboard excellent	Fair expandability	Fair	Excellent price	Good
Users						
Jonathan Meyers, Meyers & Associates	█	█	█	█	▙	Nice but no mouse port
Steve Norris, Digital Research, Inc.	█	▙	█	▙	█	Big power, small package
Bruce Weigel, Wimpey Minerals, Inc.	▙	▙	█	▙	█	Great power management
Jay Nichpour, Megabyte, Inc.	▙	▙	▙	▙	▙	Standard product
Analysts						
Jerry Caron, Faulkner Technical Reports	▮	▙	▮	▮	▙	Plain vanilla, good price
Norman Weizer, Arthur D. Little, Inc.	▙	▙	▮	▮	▙	Good price/performance

Key: █ Very good ▙ Good ▮ Fair ▪ Poor Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey. NC: No comment. **Infoworld* ratings based on 1-to-10 scale.

Vendor financial ratings

Analysts	Long-term stability	Short-term performance
Eric Rueter, Rauscher Pierce Refsnes, Inc.	▙	▙
Joe McGlone McGlone & Co.	▙	▙

Ratings obtained from phone survey of analysts who follow ALR. The firm reported first-quarter profits of $3.1 million on revenue of $49.8, up from a $3 million profit on $39.5 million in revenue in first-quarter 1990

Advanced Logic responds

Dave Kirkey, vice president of marketing:

Ease of use: The display is as large as it can be and still fit in the compact unit. It is a notebook PC, and trade-offs must be made.

Design: Some may find it a bit heavy, but we would rather include the floppy interface and the hard drive options and have the product weigh half a pound more than a less well-featured unit.

Notebook 386: Dependability at a sweet price

Zeos International Ltd.'s Notebook 386 is convenient and reliable, reviewers reported, but its really outstanding attributes are its price and the company's support policies.

Performance: Reviewers reported that the Zeos, with its 16-MHz processor, falls short of the competition in performance benchmark tests.

Expandability is limited to a maximum of 5M bytes of random-access memory and only a 20M-byte hard drive. Software compatibility is very good.

Ease of use: The 12 full-size function keys take up space for cursor controls, which require two keystrokes rather than one. The IBM Video Graphics Array display is a sharp 9.5-in. diagonal design, but it displays only eight shades of gray, and the backlighting is not fully adjustable.

Power supply: The battery lasts an adequate 2½ hours. But with power-saving features, the life can be extended to just over 4 hours.

Design: The product is light — 7 pounds, 2½ ounces — but bulky at 12.2 by 10 by 2 in. The floppy drive is awkwardly located far back on one side of the box.

Value: The Zeos Notebook 386 combines good speed and simple features with a well-built design. The product costs $2,295.

Zeos International Ltd.'s 386

Reviews	Performance	Ease of use	Design	Power supply	Value	Overall
Infoworld 3/4/91	Very good	Satisfactory	Very good	Good	Excellent	7.0*
PC Magazine 8/91	Unremarkable	Readable screen	Sturdy	Good	Wise investment	Accessory-laden
PC World 5/91	Good	Keyboard excellent	Expandability good	Good	Excellent price	Best buy
Users						
Keith Sharp, Macgregor Golf Co.	█	█	▙	█	█	Well-built
Lynn D'Amico, Pitney Bowes, Inc.	▙	▙	▙	█	█	Sturdy package
Ruth Stalker, Pfizer Specialty Minerals, Inc.	█	█	▙	▙	█	No mouse port
Denny Vendlino, Billy Graham Evangelistic Assoc.	█	█	█	▙	█	Sturdy, good unit
Analysts						
Larry Perlin, Computer Science Capital	█	█	█	▙	▙	Great
Norman Weizer, Arthur D. Little, Inc.	▮	▙	▮	▙	█	Bulky

Key: █ Very good ▙ Good ▮ Fair ▪ Poor Reviewer evaluations are excerpts from articles. Refer to actual reviews for details. User and analyst ratings are based on telephone survey. NC. No comment. **Infoworld* ratings based on 1-to-10 scale.

Vendor financial ratings

Analysts	Long-term stability	Short-term performance
Eric Rueter, Rauscher Pierce Refsnes, Inc.	▙	▙
Joe McGlone McGlone & Co.	█	▙

Ratings obtained from phone survey of analysts who follow Zeos. The firm reported second-quarter profits of $2.3 million on revenue of $53 million, up from a $1 million profit on $28 million in revenue in second-quarter 1990.

Zeos International responds

Rick Apple, vice president of marketing:

Performance: There are now 40M-byte ($2,540) and 60M-byte ($2,790) hard drives available. An upgrade from 20M to 40M bytes costs $245; from 20M to 60M bytes is $495.

Ease of use: The backlighting is 100% adjustable. It can be turned down with the power-saving features.

Vendors play SL waiting game

ANALYSIS

BY MICHAEL FITZGERALD
CW STAFF

While analysts have anointed Intel Corp.'s 80386SL chip — the power management version of the 80386SX — as the chip of the future for portables, some suppliers dispute this future.

Most vendors so far have said they will wait for future versions of the chip before they will adopt it.

Of the major portable computer vendors, only Zenith Data Systems produces a laptop computer based on the 9-month-old chip, and no other major vendors have announced plans to use the chip, despite Zenith Data's claims of an eight-hour battery life for its Mastersport SL.

All of the major companies, though, seem to have at least examined both Intel's chip and Advanced Micro Devices, Inc.'s (AMD) similar chip. Twinhead Corp. has also announced plans to introduce a 386SL-based notebook, and a number of Far Eastern clone makers are said to be prepared to deluge Comdex/Fall '91 with SL machines.

Analysts said SL-based machines from second-tier cloners and the major vendors will flood the market by the first quarter of 1992. Intel agreed.

"I think it'd be safe to say the 386SL is the notebook processor of choice for the second half of this year," said James N. Chapman, director of marketing for Intel's entry level products group.

Bruce Stephen, director of personal computer hardware research at International Data Corp. in Framingham, Mass., added, "I think a lot of the new products will be based on it, and we're expecting a great amount of activity at Comdex, but sales is another question. There is definitely still a lot of life left in the SX."

Unclear benefits

Stephen also said Intel has not clearly stated the performance gains offered by the SL chip.

Vendors other than Zenith Data said the SL chip does not offer advantages to the user above and beyond those of existing notebooks.

"The SL as it stands today really has very few, if any, advantages," said Tom Martin, vice president of marketing at Toshiba America Information Systems, Inc. "The one advantage you might be able to point to is that some of the power-saving features of the SL are more automated than on a Toshiba-type implementation" of autoresume.

Martin said the SL's size means vendors will not be able to put it in a notebook form factor easily (Zenith Data's Mastersport SL is bigger than a notebook at 9 by 12 in.), and he challenged Zenith Data's claims of eight-hour battery life, saying that a Toshiba computer with its autoresume "can produce essentially the same battery life."

A Zenith Data spokesman responded that the company claims only three hours of continuous battery life but up to eight hours of use under normal work conditions.

Most vendors contacted agreed with Martin on the SL's potential but did not think it will be valuable today.

"The concept [of going toward a more highly integrated set of systems chips] is a very sound one," Martin said. He said Toshiba will follow Intel's product direction with interest and expects the company will use future versions of the SL.

Bruce Berg, portables product manager at AST Research, Inc., also downplayed the capabilities of the SL chip and AMD's counterpart.

Such talk on the SL is merely vendor bravado, according to one analyst.

"Now that Zenith's got one, they're all going to follow suit on the SL," predicted George Thompson, an analyst at Datapro Information Services Group in Delran, N.J. Thompson and other analysts then pointed to a potential glut in the notebook market.

"Once SLs get big — and they will — what is [the market] going to do with the SX notebooks that just came out last year?" Thompson asked. "I think you're going to see oversaturation occur."

Desktop use

Whether or not IBM unveils an SL laptop, it expects to use the concept, but on the desktop.

"Sure, you'll see IBM introduce desktop machines with laptop-type power management features," said Robert L. Carberry, assistant general manager for personal systems technology at IBM.

Carberry said the power savings on the desktop are becoming more important to customers with significant investments in PCs.

He added that one IBM customer recently did between $10 million and $20 million worth of retrofitting on a 15-year-old building because of soaring electrical costs.

"When they laid the building out, they said we might have one processor for every 10 people or so, and now they have something like 1.2 to every person. So the power draw of air-conditioning and [such] has turned out to be a major incremental cost to upgrading the building in order to have the workstations."

Ashton-Tate links Dbase to IBM hosts

BY JAMES DALY
CW STAFF

TORRANCE, Calif. — Ashton-Tate Corp. last week introduced an updated edition of its Dbase Direct for 3270 that allows Dbase IV users to access IBM 3270 terminal data and applications via standard 3270 terminal emulation.

Dbase Direct for 3270 Version 1.1 — Ashton-Tate's first new product since Borland International, Inc. purchased the struggling firm — allows personal computer users to perform 3270 operations directly from Dbase IV applications. Earlier versions offered this ability only to Dbase III users, spokesman Randy Sutherland said.

The new application permits information systems managers "to push mainframe development down to the PC," Ashton-Tate President David Proctor said.

Dbase extension

Dbase Direct resides on the PC as an extension to Dbase IV commands and allows users to access, manipulate and consolidate data from multiple IBM mainframe applications without having to navigate multiple screens.

It is also possible to build basic sequences to access and retrieve data from the mainframe, transfer files between the PC and IBM 370, send 3270 keystrokes or read selected fields from 3270 applications without host programming. The application requires a PC running MS-DOS and Dbase IV Version 1.1 or Dbase III Plus and a 3270 emulation board, along with the associated emulation software and IBM's High Level Language Application Program Interface.

Dbase Direct for 3270 Version 1.01 is available now for $595. Current users of Dbase Direct for 3270 Version 1.0 can upgrade for $35.

Users choose

FROM PAGE 33

that developers will be able to create 32-bit applications that run under DOS, Windows and OS/2 2.0.

A developer's kit for Version 4.0 costs $495. Current Phar Lap users can upgrade from Version 3.0 for free or from Version 2.2 for $150.

Rational said DOS/4G is available with minimal royalty fees, at prices ranging from $5,000 to $25,000. Features include a small memory footprint (less than 25K bytes in real mode), support for terminate-and-stay-resident applications, the ability to run mixed 16- and 32-bit protected mode, a source-level debugger, a linking facility and an extensible virtual memory manager.

Also provided is Rational's GLU/32 32-bit liner, which is compatible with input and command formats from Microsoft's C Linker. Virtual Memory Manager is a page-oriented facility said to allow developers to create programs that run even if they use more memory than is configured on a personal computer. It does this by swapping code and data to disk.

Separately, Rational also announced its entry into the programming tools market with two products:

- Bigwin is an application extender said to allow programmers to develop and run 32-bit Windows applications using the enhanced mode of Windows 3.0. It is targeting developers that want to build 32-bit Windows applications today vs. waiting for Microsoft's estimated 1993 delivery of Windows 4.0.

With prices starting at $5,000, Bigwin offers source-code compatibility, compiler independence and zero-based flat-model addressing.

- Winserve is a tool kit designed to ease porting of applications to Windows 3.0. Using the tool kit, developers only need to rewrite the front end of their application to run under Windows 3.0. The back end of the application continues to run in the DOS session, with Winserve providing the communications layer between DOS and Windows. Pricing starts at $5,000.

Fitzgerald

FROM PAGE 33

taping a compact disc and giving it to a friend counts as distribution of the product, which is illegal. Not that manufacturers would tend to go knocking on people's doors — the expense of going after so many individuals is a bit much for the return.

Corporate software copying, which amounts to illegal manufacture and distribution of someone else's product (akin to being able to make your own cars just by running them through a machine), is a different story.

In the last three years, the SPA has raided some 70 corporations. The bulk of these raids have occurred since last November, when the SPA decided to go after software pirates with a vengeance. By year's end, the SPA will have conducted close to 100 such raids. So far, only one has resulted in a company proving it was indeed not in violation of the law (perhaps not coincidentally, it was the only Fortune 500 corporation the SPA has raided).

In the weeks since *Computerworld* published an anatomy of an SPA raid [CW, June 17], numerous IS managers have called the newspaper. Several admitted they were in violation of the law, but others said they were not. All were nervous about the prospect of being raided and wanted to know their odds. There's a broad range.

The SPA is not indiscriminate in its raiding. It gathers solid evidence, generally from employees (in at least four cases in New York, a temporary worker has tipped them to a company's piracy, generally because the manuals are photocopied) who may be more ethical than the management or may just be unhappy with the company and want to get back at it. Then the SPA gets a search-and-seizure award from a judge and conducts its raid.

Managers who are worried that indiscriminate copying by some employees, against company policy, will generate a raid likely have little to fear, as long as the manager makes efforts to keep things clean. Kenneth A. Wasch, the SPA's executive director, admits that he has returned from trips to find software on his PC that should not be there. His mission is to stop companies that blatantly and knowingly violate the law — and in his opinion are responsible for the bulk of the $2 billion in lost sales the SPA says occurs each year in the U.S. alone.

One IS manager asked if *Computerworld* was "trying to give me an ulcer" after we printed a quote from an SPA target saying he had told his bosses there was maybe a one in 10 chance of being raided.

No, no ulcers here, and no Candid Camera, either, as one secretary at a raided firm thought. Just want to reinforce that it's a crapshoot.

Fitzgerald is a Computerworld senior writer.

To a mainframe it's a terminal.

From the back, a Macintosh is as easy on IS managers as the front is on your people. The same coax cable that hooks to an IBM 3278 terminal plugs right into the Mac through an easily installed card. Just click the mouse, and it's configured.

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Macintosh also replaces terminals at a lower cost than other PCs. One 3270 card can distribute up to 64 terminal sessions across all networked Macintosh computers over the AppleTalk® network.

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*There are two easy ways to do it. Simply add an application called SoftPC, or one of two cards from Orange Micro, the Mac286 or Orange386. **It really is free. But only while supplies last, and only in the U.S. One overview per of New Era Software Inc. Mac286 and Orange386 are registered trademarks of Orange Micro, Inc. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. SoftPC is a registered trademark

To a person it's a Macintosh.

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From the front, a Macintosh lets people be far more productive. Terminal emulation runs alongside thousands of consistent applications. All of which now have easy access to mainframe data.

tools put a civilized Macintosh face on applications written in COBOL or other production languages. And using Apple's Data Access Language, Macintosh applications cooperate with a wide range of host-based SQL databases.

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Symbologic expert system caters to nonexperts

BY CHRISTOPHER LINDQUIST
CW STAFF

Symbologic Corp. has unveiled an expert system shell with ease-of-use features that it hopes will make the product attractive to a nonprogramming audience.

The Redmond, Wash.-based company is scheduled to release Adept Version 2.0 today. The product is intended to automate nearly any procedural application, such as technical support or job training, according to the company.

The Microsoft Corp. Windows 3.0-based expert system development tool allows users to graphically create flow-chart-like "procedures" to define systems rather than use large numbers of "if-then" statements. With a point-and-click interface, users can create nodes, establish true/false/unknown logical connections, build user screens and link separate procedures into larger systems.

"It's everything we've always dreamed computer-based training would be, but nobody's ever been able to come up with a product," said Carol Remz, president of Human Resource Connections in Seattle. Remz uses the product to do work-flow analysis for several large companies. Adept lets her create graphical, interactive representations of a firm's work flow and incorporate the same information into training applications.

Adept allows any "expert" to create the application without writing any code, then lets him step through and interactively debug the application. Support for Dynamic Data Exchange lets users create such training aids as interactive tutorials for other Windows software applications.

Audience appeal

Symbologic President Stephen L. Sperry said Adept is intended to bring the benefits of expert systems to a much larger audience than they have previously attracted. Part of this marketing approach includes using very little jargon in discussing the product. "Whenever you say artificial intelligence, people start to roll their eyes," he said.

Nina Buck, director of applied intelligence systems at New Science Associates, Inc. in Southport, Conn., agreed that avoiding the technical language will help attract users. She said the product will allow companies to easily automate such things as technical manuals without having to write any code. "Service people and people that are not necessarily comfortable with the concept of an expert system would easily be able to use it," she said. "It's an end-user tool, definitely."

Adept 2.0 is available directly from the company for $695. An unlimited-use run-time license can be purchased for $1,295.

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DG notebook PC makes its debut

WESTBORO, Mass. — Data General Corp. recently joined the ranks of the notebook-size personal computer vendors with the rollout of an Intel Corp. 80386SX-based box weighing in at just under 6 pounds.

Dubbed the Walkabout/320, the 5- by 11- by 1.8-in. PC includes 2M bytes of random-access memory, expandable to 6M bytes; it comes with a 40M- or a 60M-byte hard drive. The 10-in. IBM Video Graphics Array screen offers 640- by 480-pixel resolution and 32 gray scales. Other features include an internal 1.44M-byte, 3½-in. floppy disk drive, an RS-232 serial port and a parallel interface.

Standard software is preinstalled on the system's hard disk and includes MS-DOS 4.01, communications software, power management software, a disk cache utility, a memory manager and several system utilities.

List pricing starts at $3,695 for the 40M-byte version and $3,995 for the 60M-byte version.

Both are available immediately, and pricing includes a one-year warranty.

DG also announced discounts on its Dasher series of PC products, Novell, Inc. servers and peripherals. The discounts average between 7% and 17%, and all price changes are effective as of July 1, the vendor said.

CV revs up for auto contracts

Computervision, a Prime Co. based in Bedford, Mass., recently scored a $34 million contract win to supply computer-aided design and manufacturing (CAD/CAM) systems to the Rover Group, Britain's leading car manufacturer. The contract extends over a three-year period. Rover will use the CV CADDS software system for styling, design, concept engineering and electrical design. The car company manufactures the Land Rover Discovery all-terrain vehicle.

CV has also been selected to provide more than 160 personal computer CAD/CAM software licenses to New Venture Gear in Troy, Mich., a supplier of automotive drivetrain components. Financial details of the contract were not disclosed.

NEW PRODUCTS

Software applications packages

Peachtree Software has enhanced its Crystal Accounting software package and reduced the price to $249.

The product runs under Microsoft Corp.'s Windows 3.0 and includes new documentation as well as cash accounting features, password security and finance charge calculation capability.

Peachtree Software
1505 Pavilion Place
Norcross, Ga. 30093
(404) 564-5700

Computervision Corp., a Prime Computer, Inc. subsidiary, has released Medusa Draft, a low-end version of its Medusa 2D computer-aided design system.

Medusa Draft is available on Sun Microsystems, Inc. and Digital Equipment Corp. workstations as well as Prime 50 series systems. Entry-level pricing including necessary hardware is $13,495. Software for existing systems costs $4,800. Medusa Draft is compatible with Medusa 2D designs.

The company has also introduced Versacad Drafter, an entry-level drafting software package. Versions for personal computers and for the Apple Computer, Inc. Macintosh are offered at $595 each.

Computervision
100 Crosby Drive
Bedford, Mass. 01730
(617) 275-1800

Artificial Linguistics, Inc. has created an artificial intelligence-based editing program for use with word processing packages.

Poweredit analyses text and recommends changes for grammatical correctness, clarity and style. It recognizes more than 1 million words and 200,000 usage rules, according to the firm.

Poweredit costs $295. An introductory price of $199 is currently being offered.

Artificial Linguistics
Suite 200
2301 N. Akard
Dallas, Texas 75201
(214) 720-7297

Ventanaworks has enhanced Ventanadraw, a $149 illustration software package for personal computers running Microsoft Corp.'s Windows 3.0.

Ventanadraw 1.2 includes graduated color fills, masking and node-editing tools. It also features dithering, freehand and Bezier curve capabilities and undo, drag and rotate.

Ventanaworks
Suite 108
2111 S. Industrial Park
Tempe, Ariz. 85282
(602) 968-9874

Strategic Mapping, Inc. has introduced Atlas Mapmaker for Windows.

The software package for the Microsoft Corp. Windows 3.0 environment allows users to analyze data from spreadsheet and database files according to geographic region and create presentation maps. Maps can be rotated or scaled. The product is priced at $495.

The company also announced an upgraded version of Atlas GIS, its geographic information system that incorporates a geographic database and drawing and editing tools. Version 1.1 includes computerised street maps and a built-in report writer.

Strategic Mapping
Suite 250
4030 Moorpark Ave.
San Jose, Calif. 95117
(408) 985-7400

The Tangent Group, Inc. has unveiled Avenue, a software program for moving information from one personal computer-based application to another.

Avenue converts ASCII files into more than 25 other file formats, according to the company. It allows users to select complete or partial files and preview the data before converting it.

The product costs $369.

Tangent Group
Suite 205
18702 N. Creek Pkwy.
Bothell, Wash. 98011
(206) 486-5629

Solomon Software has enhanced its Profitwise series of personal computer-based accounting software.

Version 2.1 includes a cash-basis accounting option for use with the General Ledger segment, enhanced sales tax handling and statement line printing and support for the Canadian goods and services tax.

Profitwise integrates General Ledger, Accounts Payable and Receivable, Payroll and other business accounting modules. The package costs $395.

Solomon Software
1218 Commerce Pkwy.
Findlay, Ohio 45839
(419) 424-0422

Development tools

Data Techniques; Inc. recently announced Imageman, an object-oriented image management library for the Microsoft Corp. Windows 3.0 environment.

Imageman lets users add image display and print capabilities to Windows applications. Tag Image File Format, Encapsulated Postscript, Bitmap and other image formats are supported. The product can be used by any language that supports Windows Dynamic Link Library calls.

Imageman costs $395 or $995 with source code included.

Data Techniques
Suite 120
1000 Business Center Drive
Savannah, Ga. 31405
(912) 651-8003

Absoft Corp. has released a version of its Object-Oriented Fortran 77 compiler for Next, Inc. workstations.

The product recompiles code from the VMS environment. Compile time options for cross-platform compatibility and for performance optimization on the Next systems are included. The product is compatible with the Next Interface Builder software tool kit, according to the vendor.

The compiler costs $995.

Absoft
2781 Bond St.
Rochester Hills, Mich.
48309
(313) 853-0050

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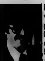
NETWORKING

COMMENTARY

Jeffrey N. Fritz

Time for new network rules



In recent weeks, the telephone network has experienced several major hiccups. Network signaling problems caused three serious losses of long-distance service in the mid-Atlantic states and California. The severity and frequency of the network failures attracted the attention of the nightly news programs. Analysts and newscasters wondered if the telephone network infrastructure had become so complex that it was crumbling under its own weight.

It is true that the telephone network is becoming more complex and difficult to manage almost by the minute. It is undergoing massive changes both internally and externally. For one thing, customer premises equipment (CPE) has become intelligent and feature-rich. More importantly, it has become an active part of the network. This means that the rules for installing devices on the telephone network should be changing. But are they?

Some users have begun to wonder what the regional Bell operating companies, the local exchange carriers and the interchange carriers, AT&T, MCI and Sprint, are doing to protect the network and users from CPE compatibility problems. In the past, devices connected to telephone networks were unintelligent and passive. The intelligence was in the central office switching equipment under the control of the telephone company. The end-user CPE simply reacted, such as a modem does when it goes off hook to answer a call. With the arrival of Integrated Services Digital Network (ISDN), frame relay and fractional T1, devices are no longer passive. CPE, such as ISDN terminal adapters and desk sets, has become active and intelligent.

These devices interact with the telephone switching network to accomplish their tasks. While this provides great power and flexibility, it also increases the risks of network errors that could extend well past the CPE or even the local switch.

It's time for the carriers and

Continued on page 49

BASF casts distributed computing vote

Netwise RPC tools form basis of German firm's global client/server environment

BY ELISABETH HORWITT
CW STAFF

BASF, the $50 billion German manufacturing giant, has become one of the biggest companies to put remote procedure call (RPC) technology at the heart of its user computing strategy.

The company plans to make RPC tools from Netwise, Inc. the basis of a client/server environment that will support thousands of multivendor workstations throughout its worldwide divisions, according to August Wilhelm Jagau, manager of international architecture at BASF's biggest company, BASF AG.

The RPC technology promises to "allow users on whatever workstation to access whatever service on whatever server over whatever protocol," Jagau said. This is an important step toward BASF's goal of "free flow of data" from the conception of a product through manufacturing to marketing, he added.

In addition, providing transparent communications across users in various BASF subsidiaries "definitely fits" with the company's intent to do business effectively in the European community that will be initiated in 1992, Jagau said.

BASF's Jagau eyes *free data flow*

The company's long-term goal is a set of core applications that can migrate and provide transparent communications "across hardware, networking and software boundaries," Jagau said.

Toward this end, BASF is standardizing on Oracle Corp.'s database system and is pushing for user interfaces that have at least the look and feel of the Open Software Foundation's (OSF) Motif.

However, BASF is not about to enforce uniformity on its companies' current hodgepodge of workstation, server and networking environments. It will use Netwise's RPCs and network application programming interface to buffer applications from varied computing and local-area network environments.

While MS-DOS is the client system at BASF, OS/2, Apple Computer, Inc.'s Macintosh and Unix all have strong niches. LAN systems include Novell, Inc.'s Netware, Microsoft Corp.'s OS/2 LAN Manager and Apple's Appleshare.

BASF began moving from a centralised to a work group-based computing strategy in 1986. Currently, research and engineering departments tend to work on distributed minicomputer and microcomputer systems. Factory planning, administration and marketing systems continue to run on IBM mainframes, Jagau said.

BASF does not plan to throw away its mainframes, along with some 600 man-years in Cobol programming, Jagau said. Rather, the intent is to enable workstations to access services and applications on mainframes, as they would any other server.

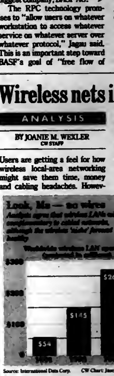
Netwise's ability to hook up with mainframe services was one of the main reasons BASF chose the Boulder, Colo., company's RPC.

Wireless nets in the balance

ANALYSIS

BY JOANIE M. WEXLER
CW STAFF

Users are getting a feel for how wireless local-area networking might save them time, money and cabling headaches. However, many are anxious for the fledgling technologies to prove they are worth their salt.



Source: International Data Corp. CW Chart: Janell Genovese

Potential drawbacks related to price, performance and security have been cited by users as would-be trade-offs to the quick, on-the-fly moves and changes that wireless LANs provide.

"The jury is still out on whether we can afford wireless," said Houghton LeRoy, principal network engineer at The Foxboro Co., a process control systems manufacturer in Foxboro, Mass. His firm is working with Windata, Inc., a wireless LAN vendor in Northboro, Mass., to evaluate spread-spectrum technology, one of three wireless LANs on the market.

The cost of a wireless connection averages about $1,000, depending on technology used, plus the cost of a LAN adapter card. Where wireless will best pay off, analysts agreed, is in installations that are often moved or changed. One example is the Oxford University Press, which recently tied its factory to Digital Equipment Corp. VAX hosts via an LXE, Inc. terminal server product that links factory terminals to the company's Ethernet network via the widespread Transmission Control Protocol/Internet Protocol.

Such mobile users benefit from wireless because they retain cabling and labor investments, and installation is low-tech and fast.

LeRoy said he is investigating wireless for tying Foxboro's factory floor into the corporate network and to link sites "that are too difficult or expensive to

Continued on page 48

EPA user deems DEC routing tool sluggish

BY JOANIE M. WEXLER
CW STAFF

RESEARCH TRIANGLE PARK, N.C. — For more than a month, Bruce Almich had been trying to figure out if Digital Equipment Corp.'s multiprotocol router or X.25 gateway, announced during DEC's June 3 barrage of "open" product rollouts, would let him integrate Transmission Control Protocol/Internet Protocol (TCP/IP) and Decnet traffic while migrating toward Open Systems Interconnect (OSI) standards.

Finally, he decided the answer was no.

The problem, according to the U.S. Environmental Protection Agency's manager of data communications, is that DEC's router software offers "abysmally slow" performance because of memory limits in the existing hardware for running combined TCP/IP and Decnet traffic. DEC's new software is an upgrade to its Decnet-only router, adding TCP/IP and OSI routing.

Alternatively, Almich said he could install DEC's new X.25 software and get "outstanding" performance, but he would have to dedicate separate bandwidth to Decnet and TCP/IP traffic.

"You always like to have the biggest pipe you can afford dynamically shared among all your protocols, rather than having to put in fixed walls between bandwidth," he said.

The waiting game

Almich said he will have to wait for DEC's Network Integration Server 600 — a multiprotocol bridge/router supporting various local- and wide-area networking technologies — to ship, although no availability date has been announced. In the meantime, he said, he might have to install additional 56K bit/sec. lines to handle his growing TCP/IP and Decnet traffic.

"What I need right now is Decnet Phase IV [all Decnet protocols] and TCP/IP dynamically routed in one pipe," Almich explained. He said other agencies, under a federal mandate to implement OSI-capable products with each new procurement, are in a similar bind.

"Fortunately, the EPA is small enough that I can live without Phase V for about a year until my address space starts running out," Almich said. Decnet Phase V, renamed Advantage Networks by DEC at its June 3 announcement, promises to integrate proprietary Decnet, TCP/IP and OSI on DEC systems.

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Software tool intended to ease backup concerns

BY ELISABETH HORWITT
CW STAFF

PARSIPPANY, N.J. — A software package called Upstream just introduced by Enterprise Data, Inc. is said to address the classic information systems headache of users who forget to back up their files.

Upstream automatically backs up personal computer files on an IBM mainframe, thus ensuring that critical data is not wiped out by a disk crash, power surge or other catastrophe, Enterprise Data said.

However, the software's usefulness could be constrained by the length of time it takes to back up PC files over remote PC-to-mainframe connections, according to Mark Larow, a senior manager at Ernst & Young.

"There is a crying need" for products such as Upstream because "everyone loses their files and disks," Larow said. A number of third parties have recently begun introducing products that automatically back up PCs and Apple Computer, Inc. Macintoshes on local-area network file servers, he added.

Taking advantage

Enterprise Data's mainframe approach has the advantage — at least from IS managers' perspective — of putting PC files back under the control of IS, Larow pointed out.

However, server-based backup systems have the advantage of being able to back up PC files at LAN speeds of 4M bit/sec. or faster, Larow said. In contrast, a local LAN-to-mainframe gateway supports speeds of 64K bit/sec., while remote connections to the mainframe rarely go faster than 9.6K bit/sec.

It takes about 30 seconds to back up a typical 30K-byte file, "but large database files take about 10 minutes to back up," Larow said.

The mainframe can back up multiple stand-alone PCs, but a LAN gateway can become a bottleneck because it can support only a limited number of PC-to-mainframe sessions.

Another consideration for would-be buyers is that a 100M-byte hard disk on a LAN is much less expensive than 100M bytes on a mainframe storage system, Larow said.

PC users need to identify initially what files or portions of files they want to back up, how often and at what time of day, company spokesman John Deliman said. "Once that's specified, the mainframe takes control."

What happens is that at the specified time, a "small program that sits in the background" contacts the mainframe portion of Upstream and initiates the backup, said Sid Tannenhaus, vice president of mainframe development at Enterprise Data.

If the PC happens to be running a program, an on-screen message reminds the user that it is backup time.

If a communications link goes down during a backup, Upstream will restart the job after the last file that was successfully backed up, Deliman said.

Upstream increases the efficiency of PC-to-mainframe communications by using IBM's peer-to-peer LU6.2 protocol rather than a 3270 terminal-to-host connection, according to Deliman.

Upstream currently backs up stand-alone and networked MS-DOS-based PCs. An OS/2 version is slated for the third quarter.

The workstation software is priced at $420 per PC, with volume discounts available. The LAN server version costs $1,980. The mainframe software is priced according to mainframe group and ranges from $17,500 to $45,700.

E-mail speeds credit checks, links DEC, Wang systems

BY ELLIS BOOKER
CW STAFF

NEW YORK — A real estate developer outside Dallas fills out an application for a multimillion-dollar loan. The form, converted to electronic mail, is sent over a wide-area network from a loan processing office in Dallas to New York, where it is reviewed and sent on for a final yea or nay at a twice-weekly meeting at the bank's head office in Utrecht, Netherlands.

Unfortunately for Rabobank Nederlands, Holland's third largest bank, the last leg of this loan form's journey was the slowest, most expensive and most error-prone.

That is because until recently, the New York branch of Rabobank used fax and expensive courier services, according to Vice President of MIS Edward DeRosa.

"The courier service was $22 to $25 [per transaction]," be said. Direct-dial fax matched the E-mail cost of $4 to $5 per application, but "the quality went way down .... Once [the form] got to the head office, it had to be distributed, and [photocopying] a fax doesn't work well."

The solution was AT&T's Easylink E-mail service.

"Conservatively, I'm sure we've reduced our fax costs by 50%," said DeRosa, noting that the E-mail link eliminates the need to retype forms.

Speed is another benefit, he said. "The credit committee in Holland meets twice a week, so if the courier missed it, our customer might have to wait until the following week," DeRosa said.

Today, the credit application cycle has dropped from an average of four days to one, "and if we hit it just right, we can turn around [an application] in one day," DeRosa added.

Like the applications themselves, approvals, denials and requests for information on applications are transmitted from Holland to New York via E-mail.

Office Access software from Easylink Services also provides connectivity between the U.S. branch's Digital Equipment Corp. VAX-based systems and the head office's Wang Laboratories, Inc. computers.

Rabobank

In addition, custom software written by AT&T allows the credit application's format, which includes 132-character-wide spreadsheet data, to be retained in the transmission.

Each loan application is composed of up to 20 pages of text and six pages of spreadsheet data.

"The next step for us is the ability to communicate one-on-one with our counterparts in the head office," DeRosa said.

This capability already exists in the domestic WAN, which was deployed in 1988 and 1989 to connect New York with regional offices in San Francisco, Dallas and Des Moines, Iowa.

This will await the head office putting terminals atop the desks of the general business staff. "We already communicate with our MIS counterparts over E-mail," DeRosa noted.

Another project Rabobank has already begun piloting with AT&T will involve electronic data interchange and electronic funds transfer.

Rabobank is a cooperative, made up of some 970 member banks in the Netherlands.

Wireless nets

FROM PAGE 45

wire." Currently, spread spectrum looks to be "twice the price of a cabled scenario. I'm not overly excited about that," be said.

The Token Ring-compatible infrared-based LAN made by BICC Communications in Auburn, Mass., appears to be a step ahead of its wireless competitors — most notably Motorola, Inc., with its microwave-based Altair product, and NCR Corp., with its 2M bit/sec. spread spectrum Wavelan.

BICC's Infralan has been successfully linking 50 users since January at The Travelers Corp. in Hartford, Conn., said Nick Blazensky, manager of site design at the insurance firm.

Blazensky said Infralan is running faster than its cabled Token Ring counterparts because "light travels more quickly through air than electricity does through copper." In addition, he said, the price per node is 30% to 50% cheaper than its copper equivalent.

He said Infralan's security is "better than on copper because if you interrupt a light path, it will wrap onto a backup path. That capability isn't in spread spectrum or microwave."

Blazensky chose infrared technology — whose drawback is that it requires line-of-sight between nodes — because of its Token Ring compatibility, potential for speeds above 16M bit/sec. (not likely with microwave or spread spectrum, analysts agreed) and cost. He said LANs are communicating transparently through glass, and he is working with BICC to use mirrors to steer data around corners.

Other users have considered wireless LANs but are not yet sold. Joe Giljohann, senior microcomputer specialist for the city of Milwaukee, said, "We have a couple of places where wiring is a problem because of asbestos in the walls." He said he also considered wireless for keeping the network up and running during remodeling projects.

However, since the city is an Ethernet (10M bit/sec.) shop, Giljohann considered the only Ethernet-compatible LAN available today: Motorola's Altair. "It only gets 3M to 3.5M bit/sec. throughput," be said. "I won't accept something less and pay a premium for it," be said.

Marty Palka, an analyst at Dataquest, Inc., agreed that some wireless LAN performance is not yet up to snuff. "Altair is not yet running at 10M bit/sec.," be said. "This is an issue for performance-sensitive LANs."

Dell Klingensmith, director of information network services at Case Western Reserve University in Cleveland, has dismissed wireless LANs as a widespread option because "long term, we see the need for much higher bandwidth than it can provide. We see voice, data and video — everything digital — running together."

Motorola is making headway with some user concerns. In May, it dropped the price of its Altair user module from $3,495 to $995 and this month added Simple Network Management Protocol (SNMP) support to its equipment.

The standards-based SNMP support "was a necessary step," said Charlie Robbins, director of communications research at Aberdeen Group in Boston.

A question of license

One issue facing the IEEE 802.11 committee on wireless local-area networking is whether a chunk of frequency should be dedicated to it by the Federal Communications Commission.

The committee has reportedly decided that a technology that does not require user licenses is the way to go. Currently, that does not include microwave, which makes licensing one of Motorola's "biggest challenges," said Charlie Robbins, director of communications research at Aberdeen Group in Boston. "If somebody wants to move a LAN and has to get a license every time, that is difficult."

Apple Computer, Inc., which has yet to announce any wireless products, filed a request with the FCC in January to open up 40 MHs of bandwidth in the 1.8-GHz range for anyone using in-building wireless data communications on an unlicensed basis. The request is still out for comment.

Spread spectrum and infrared take advantage of unlicensed bands that are currently allocated and available. However, spread spectrum is much more limited than infrared in frequency.

Lee Doyle, director of LAN research at International Data Corp. in Framingham, Mass., does not believe that all three wireless LAN technologies will survive. "The standards process always represents a narrowing down" to the lowest common denominator, he said. "You don't need all three."

JOANIE M. WEXLER

Forum building directory of intercompany E-mail users

BY JIM NASH
CW STAFF

New trials on a common directory service for electronic-message users may initially raise more questions than answers. That is fine with some industry observers, as long as at least a basic directory hits their screens soon.

Earlier this month, the North American Directory Forum, a 13-member group of electronic mail service providers, agreed to build experimental directory services based on specifications the forum has developed.

The specifications are rules and capabilities grafted onto the CCITT X.500 directory standard. While the forum's experiments are among several under way around the world, no X.500 directory services are commercially available.

" 'How do I send mail to my friend at such and such a company?' — I must hear that question a dozen times a day," said Steve Wolff, director of the National Science Foundation's networking division in Washington, D.C. The directory service is expected to cut those types of questions at the pass by giving E-mail users a "white pages" reference for other users on disparate messaging systems.

Each forum member will take the specifications and tinker with its own idea of how the directory should work with other members' systems. Member companies are AT&T, Bell Atlantic Corp., Bellcore, BT North America, Inc., General Electric Information Services, IBM, Infonet Services Corp., MCI Communications Corp., Pacific Bell, Performance Systems International, Southwestern Bell Corp., Sprint International and the U.S. Postal Service.

Trials focusing initially on a directory for public messaging carriers are expected to begin early next year. The forum expects to learn how its specifications work with Message Handling System information and how different information-updating techniques perform.

Given the "extremely critical" need for E-mail directory services, said Bank of Boston's Christine Stormount, X.500 development is moving too slowly. Stormount, director of network applications services at the bank's New York offices, said much of the directory work done is inadequately addressing the need to devise a system that can handle the needs of large firms.

Poor search patterns

Most existing directories for a vendor's own E-mail product lead users in a hierarchical search pattern based on features such as the department in which a person works, Stormount said. "A relational capability is required," she added.

"The forum is a well-conceived effort," Wolff said. "Anyone watching [X.500 development] would applaud." He said it is impossible to tell when or if a viable service would result from the forum's specifications. A spokesman for the forum said trials should last at least a year.

Asked which features users are likely to require of a directory, Wolff said they are probably hungry for any basic, common directory. "What matters is that someone start building a directory and start populating it" with listings, he explained.

Beyond a relational database approach, Stormount said, any successful directory will be capable of expanding and contracting in order to quickly reflect new and deleted users. She also said a directory should not depend on department names for locating a person when only the name is known.

"We physically move 8,000 people around Boston every year," she said. "We change department names whimsically."

Christian Science monitors net

ON SITE

BY CAROL HILDEBRAND
CW STAFF

BOSTON — Taking care of one *Monitor* was easy enough. But when the print version started spawning television and radio fry, the Christian Science Publishing Society dug into its pockets for a monitor of a different kind — a system to manage its worldwide network.

The society gave the nod to the Lance network management system from Micro Technology, Inc. in Anaheim, Calif. Based in Boston, the umbrella organization for the media interests of the Church of Christ, Scientist, has been in business since 1898.

From its widely respected newspaper, *The Christian Science Monitor*, the society has hatched the *World Monitor* magazine, as well as radio and TV stations.

Pressing need

It was when the organization went into doing 24-hour cable TV that the need for network troubleshooting became pressing, said Lori Steinmetz, data network manager at the society. "All of the news stories and much of the teleprompting is done on-line," he said. "We really can't have any downtime."

With that kind of application depending on the network, Steinmetz said, he was looking for a way to practice preventive medicine on his system. "We wanted to move away from being reactive and catch problems before they occurred," he said.

The society's current network environment is international, with Digital Equipment Corp. VAX nodes in Tokyo and London as well as at the regional bureau in Washington, D.C.

The 13 Ethernet segments are interconnected via bridges from 3Com Corp., Cabletron Systems, Inc. and Kinetics' Fastpaths. The network runs Decnet and DEC's LAT, as well as Apple Computer, Inc.'s Appletalk and a limited amount of Transmission Control Protocol/Internet Protocol traffic.

Steinmetz said he was attracted to Lance for several reasons. First, he said, he wanted it to be multiuser-capable so that several people on the operations staff could monitor the system simultaneously. Although several vendors claimed that feature, he said, most systems allow personnel to monitor two different segments of a system simultaneously but do not allow two people to monitor the same segment at the same time.

Into billions

Network management systems are projected to grow an average of 17% annually for the next four years

Network management systems revenues from end users (in millions)

[illegible]	$[illegible]
[illegible]	$[illegible]
[illegible]	$977
[illegible]	$1,138
[illegible]	$1,3[illegible]

Source: Dataquest, Inc.
CW Chart: Doreen St. John

The second reason Steinmetz said he chose Lance was that the system was compatible with Simple Network Management Protocol (SNMP).

SNMP, a protocol an increasing number of vendors are agreeing to support, provides a common means of communications among diverse network and network management elements on a network and a central network management system.

Using Lance, Steinmetz said, "provides me with a window for looking into these systems somewhat easily."

Being able to monitor the network has pinpointed some troublesome areas. In fact, Steinmetz said that his staff is reconfiguring the network as a result of things they found.

For example, they discovered that the Apple Macintoshes used to put together *The Christian Science Monitor* were using the network more heavily than was originally anticipated. "They were pumping 1M- to 10M-byte files through the system in the early morning when they were prepping the paper," Steinmetz said.

Moving the Macintoshes out of the main traffic loop should result in increased speed for both the Macintoshes and terminal users, he said.

Wielding Lance

In the three months since Lance was installed, Steinmetz said, he has wielded it in a number of ways to pin down potential network problems. By being able to monitor traffic on a bridge, Steinmetz can arrive at the average amount of traffic usually found there. Spot checks can then be compared with the average, and any abnormalities can be investigated.

Lance also notifies the operations staff almost immediately when a bridge goes down. "Previously, we'd know when a user called us up and told us," Steinmetz said. Because the data is printed out, "it makes it easier for us to get reimbursement for the time that line was out," he said.

Steinmetz said he is already capable of controlling his Cabletron and 3Com bridges through SNMP with Lance, thus eliminating two pieces of proprietary software. He is currently working on bringing his Kinetics components into compatibility and said that when DEC delivers on promises of SNMP capability, he will be able, in theory, to move that environment over as well.

Steinmetz also found that backups were using too much of the network. He was able to save funds and space by reducing the amount of backups.

Fritz

FROM PAGE 45

regulators to learn a fact of life well known by just about every LAN administrator: The introduction of intelligent devices on a network must not be excessively restricted, but these devices must be coordinated and controlled. CPE vendors must ensure that their equipment complies with centralized standards before it earns the right to be part of the network.

Recently, West Virginia University's (WVU) LAN was plagued by two massive failures. Both were caused by malfunctions in devices on a LAN segment.

In one case, a mail gateway inundated the network with broadcast storms. In the second case, a server crashed, causing its client machines to flood the campus LAN with "Where's my mamma?" messages. The university is now aware that steps must be taken to control devices on the network.

The situation facing WVU is not particularly different from the situation facing the telephone network. Both are interconnected networks and vulnerable to widespread failures caused by local devices. Both networks must be protected by a centralized agency set up to test and certify devices for compliance with the network's standards.

In WVU's case, steps are being taken to set up centralized coordination and control. However, the telephone network has no centralized control over user CPE. Therefore, there is no guarantee that the network integrity can be maintained.

Although Bellcore has some certification procedures for CPE, it does not check devices for switch compatibility, and Bellcore certification is not mandatory. Because Bellcore's certification results are not made available to the public, the customer is none the wiser.

The carriers must band together and create a unified acceptance policy. Certification must be required and a seal attached to the CPE indicating that the device has been tested and found to be in compliance with telephone network standards.

In view of the potential for widespread risk, it is curious that the telephone carriers have not required certification and compatibility testing for intelligent CPE devices.

In the years before deregulation, the telephone company was very careful about allowing customers to connect unknown devices to its lines. Its near paranoia resulted in the now famous Carterphone decision that helped loosen Ma Bell's tight noose on CPE.

Now, just about anything can be connected at any time to the telephone network. This offers users great freedom but has also introduced significant risks. Maybe it's time for the deregulation pendulum to move just a little closer to the center and for carriers to insist that only certified devices be made part of the telephone network.

Fritz is a data communications analyst at West Virginia University in Morgantown, W. Va.

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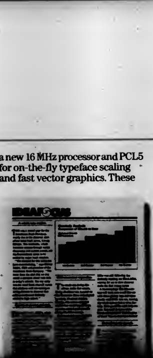

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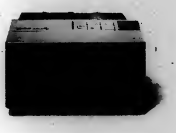

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NEW PRODUCTS

Local-area networking hardware

The Hublet, a four-port repeater for 10Base-T networks, has been announced by Shiva Corp.

The Hublet connects four devices, including personal computers, Apple Computer, Inc. Macintoshes and workstations to an Ethernet network through a single 10Base-T port. Hublets can be daisy-chained.

The unit is priced at $399.

Shiva
1 Cambridge Center
Cambridge, Mass. 02142
(617) 252-6300

Tiara Computer Systems, Inc. has developed a line of stand-alone and internal concentrators for 10Base-T networks, including an expandable internal concentrator.

The stand-alone version, called the 10Base/T Lanhub, is offered with eight ports for $545 or with nine ports for $595.

The internal concentrator, the 10Base/T Expandable Hubcard, is expandable with configurations including from four to 12 ports. The number of available ports can be raised by plugging additional Hubcard Expansion Modules into the card. Pricing for the Hubcard ranges from $495 to $895. Expansion modules cost $129.

Tiara Computer Systems
1091 Shoreline Blvd.
Mountain View, Calif.
94043
(415) 965-1700

Intel Corp. has introduced the Netport print server for Token Ring networks.

Netport allows plug-and-play printer installation in networks with 4M bit/sec. and 16M bit/sec. data speeds. It is software-upgradable and supports source routing. Netport costs $1,195.

Intel
CO3-7
5200 N.E. Elam Young
Pkwy.
Hillsboro, Ore. 97124
(503) 629-7354

Local-area networking software

Netplus Software, Inc. has made available the Onqueue Task Server for local-area networks under Novell, Inc. software.

The product comprises two programs. The first module turns the workstation on which it is installed into a dedicated task server. The second module allows all users on the network to send tasks to the task server workstation for execution, freeing up the users' own systems for other work, the firm said. New jobs submitted while the task server is busy wait in queues, and the workstation notifies users when their tasks have been completed.

The Onqueue Task Server costs $495.

Netplus Software
47 Wake Robin Road
Sudbury, Mass. 01776
(508) 443-6043

Network management

Vitalink Communications Corp. has announced the Open Management System (OMS), a network management system based on industry-standard protocols and platforms.

OMS, running on Sun Microsystems, Inc. Sparcstations and the Sunnet Manager software platform, will initially offer support for the Simple Network Management Protocol. Support for other protocols will be added. A set of applications programming interfaces for expanding the management capabilities will be included with the product.

Pricing ranges from $7,500 for OMS software only to $34,000 for hardware and software combinations.

Vitalink Communications
6607 Kaiser Drive
Fremont, Calif. 94555
(415) 794-1100

Dowty Network Systems, Inc. has announced a security system for communications between personal computers, terminals and mainframes.

The Scanet Data Encryption System, including both hardware and software, provides Data Encryption Standard-compliant encryption on the company's Scanet communications network. Data passing between nodes can be decrypted only if both nodes have received a code key from the network's Key Management Center software.

The hardware costs $199 per node, while software costs from $150 to $250 per node.

Dowty Network Systems
555 Twin Dolphin Drive
Redwood City, Calif. 94065
(415) 508-2500

Modems

The Complete PC has released a portable fax/modem for DOS-based personal computers.

The Complete Fax/Portable+ provides 9.6K bit/sec. Group III fax capability and a 2.4K bit/sec. modem. Data compression and error correction features are included. The unit weighs 10 ounces, the company said, and it plugs into any PC serial port. Power is supplied by an AC adaptor or a 9-V battery.

The product costs $499.

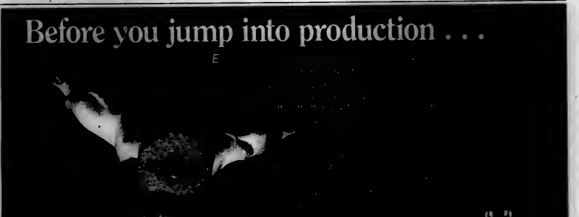
The Complete PC
1983 Concourse Drive
San Jose, Calif. 95131
(408) 434-0145

Hayes Microcomputer Products, Inc. has introduced the V-series Ultra Smartmodem 14400.

The modem implements industry standards with CCITT V.32 bis for 14.4K bit/sec. throughput and CCITT V.42 bis for 38.4K bit/sec. compressed throughput. It includes an X.25 packet assembler/disassembler and offers IBM Systems Network Architecture and Integrated Services Digital Network connectivity as well.

The Ultra 14400 is priced at $1,199. Upgrades from Ultra 9600 models cost $275.

Hayes Microcomputer
Products
705 Westech Drive
Norcross, Ga. 30092
(404) 449-8791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MANAGER'S JOURNAL

A hard look at the glass house

Varian CEO J. Tracy O'Rourke believes business and IS still have a big gap to bridge

BY CLINTON WILDER
CW STAFF

Strolling through Palo Alto, Calif.-based Varian Associates, Inc.'s sunny campuslike headquarters with his sleeves rolled up, Chairman and Chief Executive Officer J. Tracy O'Rourke projects a casual air that belies his reputation as one of America's best-regarded manufacturing executives.

After a successful tenure as president of Allen-Bradley Co. and executive vice president of parent Rockwell International Corp., O'Rourke joined Varian 18 months ago to play the role of change agent.

O'Rourke has big plans under way for change at the $1.26 billion electronics equipment maker, including applying for the Malcolm Baldrige National Quality Award next year. Another plan calls for revamping Varian's information architecture, a scheme that he emphasises has less to do with computer hardware than with rethinking the business.

Yet on the subject of fully integrating information systems into business, O'Rourke has doubts whether the current generation of IS and business executives is up to the task.

On the need to improve the information flow:

"We're in four separate businesses. Today I doubt seriously if we could tell you very accurately what region of the country we are doing the most business in. We know that intuitively, maybe, but I'm saying [we don't have a system] where you can get hard data and do that.

"For most of our field service requests, we fill out a piece of paper saying what the engineer did to fix the problem. We don't have a system where all that information is entered into a database, where you could slice it in different ways and find trends that would enable us to do corrective action. We're putting those in as fast as we know how."

On his selection of a business executive to lead Varian's IS change effort:

"We have a very fine guy who manages our information systems named Klaus Harmening. He's a real pro, but until recent times, I don't think he's been asked to think in the way we're talking about.

"Each of our executive vice presidents has what I would call one horizontal responsibility of change across the company. One is spearheading the Baldrige effort. Al Lauer, executive vice president for our instrumentation business, is leading the change in the way we do the information systems, to come up with the new architecture that is customer-driven. He and I review that progress once a month, or maybe a little more often."

On the IS executive's image:

"I think the IS executives have had an unfortunate past, and it's not their fault. I gave a little talk on this at the [Society for Information Management] conference two years ago. They have been seen as people who ran utilities. They could just as well have been running the local power plant. And they were seen as obstructionist, unwilling to talk business language — talking technobabble and using that to cause you to not get the application software that you needed when you wanted it or how you wanted it.

"So these poor people have grown up with that repuation, and that's sad. It's not their fault. They have been kept on the raised floors in the air-conditioned rooms. We asked at that SIM meeting how many CIOs had met with their CEOs in the past six months, and there were about two hands raised in a group of 300 people.

"Now I suppose I should have my hand up because I haven't met with Klaus recently either. We've chosen to go about it a different way, and I've got a guy working directly for me doing this [information architecture plan] probably three days a week."

On a "role model" chief information officer:

"At Rockwell, a guy named Jim Sutter is one of the unique people. He may not be able to run your marketing department, but he understands the business. He has two or three other key people who are more technocrats.

Andy Freeberg

varian

The CEO: *J. Tracy O'Rourke, 56; Bachelor's degree in mechanical engineering, Auburn University; U.S. Air Force officer.*

The career: *Chairman and CEO of Varian Associates, Inc., 1990-present; executive vice president and chief operating officer, Rockwell International Corp., 1989-90; president and COO, Allen-Bradley Co., 1981-89; other senior management positions at Allen-Bradley, Chemetron Corp., The Carborundum Co., Liquid Nitrogen Processing Corp. and Du Pont Co.*

Accomplishments: *Restored Varian to profitability this year; grew Allen-Bradley from $450 million to $1.4 billion in revenue; named International Industrialist of the Year by the Society of Manufacturing Engineers.*

"How many Sutters are around, I don't know. He has a vice president title and a zillion-dollar budget and all that kind of stuff. Very responsive guy, no axe to grind about whether you're centralized or decentralized, no axe to grind about whether you developed or bought the software. He sees himself as an information source, sees himself as having *customers.*"

On the failure of CEOs and business executives to embrace IS:

"Too many of us who are past 40 and running businesses grew up in an era when all this stuff was some kind of black magic, technology way beyond our comprehension. Unfortunately for the IS professional, most of the chief executives that he or she would deal with — I wouldn't say they're computer-illiterate, and they don't have to be computer experts, but they're too far toward that illiterate side of the continuum, and they're uncomfortable with the IS executives when they sit and try to talk with them."

On the prospects for improving the CEO/IS relationship:

"My guts tell me that you're going to have to have an iteration — I don't know if it's a generation, but it's going to have to be an iteration of people. It's going to be very hard for either side to make that change.

"It reminds me of the story about some famous prognosticator or historian who was asked 10 to 15 years ago when he thought Communism would fail. And he answered, 'When the grandmothers die.' "

On measuring IS investments:

"If you set some artificial hurdle rate like getting your money back in two years from buying these 10 computers, and it's in soft areas like marketing and you can't measure it . . . well, then you're an accountant, you're not a business executive. If the chief executive doesn't take the leadership role — which is synonymous with risk — nobody else will, either." ●

INSIDE

▶ Corporate financial woes and merger mania imperil IS progress. Page 54.

▶ Calendar. Page 55.

COMMENTARY

Clinton Wilder

Bad breaks for businesses batter IS plans

News item: Mutual Benefit Life is taken over by New Jersey state insurance regulators to prevent a possible "run" on its shaky assets by nervous policyholders.

Yes, this is the same Mutual Benefit Life that has achieved legendary status for its information systems innovations. Just a few of Mutual Benefit's claims to IS fame are as follows:

- Its re-engineering of claims processing has been a featured case study of CSC Index and Michael Hammer.
- It has won the first-ever business/IS partnership award from the New Jersey chapter of the Society for Information Management (SIM) and has been nominated for the national SIM award as well. (Those awards will he announced next month — will there he an asterisk next to the company's name if it wins?)
- Its former top IS executive, Chuck McCaig, was in high demand on the conference circuit for his dry wit and keen insight.
- Its president and CEO, Henry Kates, was the keynote speaker at SIM's annual conference last fall in New York.

> ACROSS THE U.S., companies in a wide variety of industries are going through some tough, tough times. That means the best-laid plans of mice and IS executives can very well go astray.

Kates has now resigned in the wake of the regulator mess, and the New Jersey insurance commissioner has appointed Nicholas Katzenbach to oversee the company. Katzenbach, computer industry veterans will recall, was general counsel for IBM during the government's antitrust case against it in the 1960s.

Is this what comes from "successful" re-engineering? Sounds like the operation was a success, but the patient died anyway.

Across the U.S., companies in a wide variety of industries are going through some tough, tough times. That means the best-laid plans of mice and IS executives can very well go astray.

Look at the banking megamergers. Manufacturers Hanover has had all kinds of projects on its IS plate, some of which have been written about in these pages. In the process of trying to sort out how and what to merge with Chemical Bank, what happens to all those plans now?

Banks of this size are having enough trouble simply trying to integrate product lines, services and technology platforms in their own organizations. When Michael Simmons took over the top IS spot at Bank of Boston, for example, he found more than a dozen different vendors' hardware platforms scattered throughout the organization. The bank is now proceeding with an ambitious five-year plan to pare down the standards list and regain control of the information architecture. It's a good strategy. But what happens if Bank of Boston decides to merge with another behemoth?

The NCNB melding with C & S/Sovran announced last week will he very interesting to watch. Some observers say C & S has yet to fully digest Sovran from an IS standpoint. NCNB, of course, knows an awful lot about acquisitions because it has done so many of them. Yet one wonders if the systems issue ever came up for one instant in its longstanding effort to pair up with C & S/Sovran.

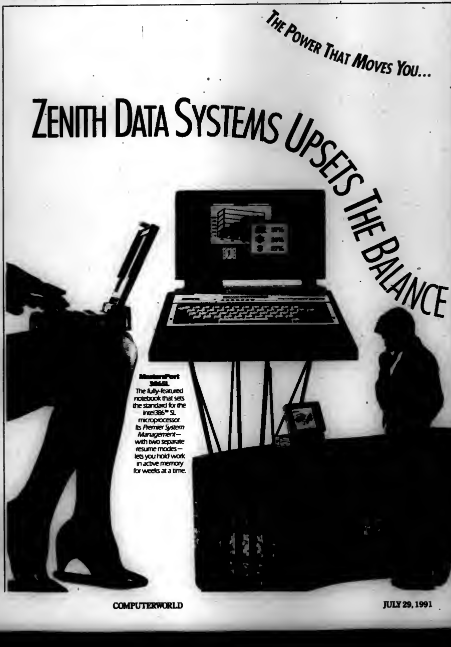
It would not be an exaggeration to say that previously formulated IS strategies are now in jeopardy at five major U.S. financial firms (the four banks involved in the mergers and Mutual Benefit). And for thousands of IS staff members at all of them, "in jeopardy" is a kind way to describe their situations.

One and a half years into the 1990s, the IS profession is in a sort of best-of-times, worst-of-times scenario. At one end, the concept of the "superstar" IS executive is emerging — a select few who are commanding unprecedented power and mind-boggling salaries and are truly reshaping their organizations.

Unfortunately, however, all that power seems to pale next to the effect of bad business decisions on other fronts, such as Mutual Benefit's spate of ill-advised real estate investments. And even though business re-engineering through IS can create fundamental change, it takes time. A blockbuster merger is perceived as a faster way out of bad economic times.

It is true that IS has come a long way from the back rooms and has made a significant mark upon corporate America, but that journey is far from over. Judging by the business headlines of the past few weeks, there is still a long way to go.

Wilder is *Computerworld*'s senior editor, management.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CALENDAR

The 10th International Conference on Enterprisewide Information Management will be held in St. Louis at the Ritz-Carlton Sept. 4-6. The conference will focus on linking technology and business planning, restructuring the business enterprise and information economics.

Speakers include Chief Information Officers John Kohler of Kimberly-Clark Corp., Larry Ford of IBM and Don Winski of Time-Warner, Inc.

For information or to register, contact Washington University's Center for the Study of Data Processing, St. Louis, Mo., after Aug. 2 at (314) 935-5380.

AUG. 18-24

Share 77. Chicago, Aug. 18-23 — Contact: Share Headquarters, Chicago, Ill. (312) 644-6610.

MIS Training Week West '91. San Francisco, Aug. 19-23 — Contact: Pamela Bassett, MIS Training Institute, Framingham, Mass. (508) 879-7999.

The Santa Cruz Operation Forum '91. Santa Cruz, Calif., Aug. 19-23 — Contact: The Santa Cruz Operation, Santa Cruz, Calif. (408) 425-7222.

Fose CD-ROM Conference and Exhibition. Washington, D.C., Aug. 20-21 — Contact: Sylvia Griffiths, National Trade Productions, Inc., Alexandria, Va. (703) 683-8500.

AUG. 25-31

Primavera Systems Eighth Annual User Conference. Philadelphia, Aug. 25-28 — Contact: Nadine Chapman, Primavera Systems, Inc., Bala Cynwyd, Pa. (215) 667-5830.

Surface Mount International Conference and Exposition. San Jose, Calif., Aug. 25-29 — Contact: Miller Freeman Expositions, Boston, Mass. (617) 232-3976.

International Security Conference. New York, Aug. 27-29 — Contact: Cahners Exposition Group, Des Plaines, Ill. (708) 299-9311.

13th Annual Satellite Communications User Conference (SCUC). San Jose, Calif., Aug. 27-29 — Contact: SCUC, Englewood, Colo. (303) 220-0600.

Database and Expert Systems Applications. Berlin, Germany, Aug. 28-30 — Contact: Dimitris Karagiannis, Ulm, Germany (011-49) 37-150-1540.

Advanced Communications Technology Satellite Program. San Jose, Calif., Aug. 28-30 — Contact: Mary B. Gibbs, Public Service Satellite Consortium, Arlington, Va. (703) 979-0001.

SEPT. 1-7

Human Factors Society Annual Meeting. San Francisco, Sept. 2-6 — Contact: Human Factors Society, Irvine, Calif. (714) 753-7006.

Very Large Data Bases (VLDB). Barcelona, Spain, Sept. 3-6 — Contact: VLDB '91-Difusora de la Informatica, SA, Barcelona, Spain (011-34) 3-418-8067.

HD World. San Francisco, Sept. 4-6 — Contact: Meckler Conference Management, Westport, Conn. (203) 226-6967.

Unix Open Solutions '91. San Jose, Calif., Sept. 4-6 — Contact: Unix Open Solutions '91, Needham, Mass. (617) 449-6600.

Print '91. Chicago, Sept. 4-11 — Contact: Graphic Arts Show Co., Reston, Va. (703) 264-7200.

SEPT. 8-14

Development Center Institute Conference. San Diego, Sept. 8-11 — Contact: Development Center Institute, Inc., Indianapolis, Ind. (317) 846-3753.

Managing the Move to Workstation-Based Development — The Wave of the '90s. San Diego, Sept. 8-11 — Contact: Development Center Institute, Inc., Indianapolis, Ind. (317) 846-3753.

Telecom '91. Edmonton, Alberta, Sept. 8-12 — Contact: Canadian Business Telecommunications Alliance, Toronto, Ontario (416) 865-9993.

Disaster Recovery Symposium and Exposition. Atlanta, Sept. 9-11 — Contact: Disaster Recovery Journal, St. Louis, Mo. (314) 846-1001.

Symposium on the Computerization and Use of Materials Property Data. Cambridge, England, Sept. 9-11 — Contact: Teresa Cendrowska, ASTM, Philadelphia, Pa. (215) 299-5546.

Digital Equipment Computer User Society (DECUS) Europe Symposium. The Hague, Sept. 9-13 Contact: DECUS Europe, Petit-Lancy, Switzerland (011-41) 22-709-4264.

Data Storage. San Jose, Calif., Sept. 10-12 — Contact: Forum Management, Cartlidge and Associates, San Jose, Calif. (408) 554-6644.

Downsizing Expo. Los Angeles, Sept. 10-12 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

Government Neural Network Applications Workshop. Huntsville, Ala., Sept. 10-12 — Contact: Rene Kirkwood, U.S. Army Research Office, Research Triangle Park, N.C. (919) 549-0641.

Information Highways: Linking America for Interactive Communications. New York, Sept. 11-12 — Contact: Business Week Executive Programs, New York, N.Y. (212) 512-2184.

ABCD: The Microcomputer Industry Association's Breakaway '91 Conference. Atlantic City, Sept. 11-13 — Contact: Deborah Keating, ABCD, Ridgeland, Miss. (601) 977-9033.

SEPT. 15-21

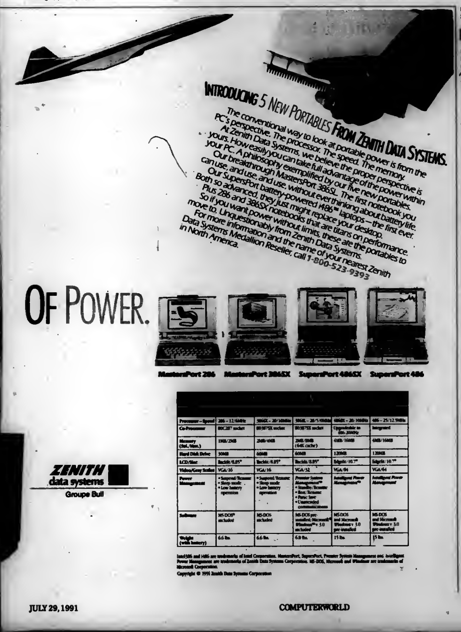
International Electronics Packaging Society (IEPS) Conference. San Diego, Sept. 15-18 — Contact: William Ashman, IEPS, Wheaton, Ill. (708) 260-1044.

Data Administration Management Association International Symposium. Seattle, Sept. 16-17 — Contact: Bill Hanenburg, Triadigm International, Los Angeles, Calif. (213) 623-0123.

Effective Methods for Information Systems Quality Assurance. Orlando, Fla., Sept. 16-18 — Contact: Quality Assurance Institute, Orlando, Fla. (407) 363-1111.

Auto-Tech '91. Detroit, Sept. 17-19 — Contact: Automotive Industry Action Group, Southfield, Mich. (313) 358-3570.

CASE Conference: Rebuilding for Software Automation with the 4Rs of CASE. San Francisco, Sept. 17-19 — Contact: Extended Intelligence, Inc., Chicago, Ill. (312) 346-7090.



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Co-Processor	80C287 socket	80387SX socket	80387SX socket	Upgradeable to 486-20MHz	Integrated
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Hard Disk Drive	30MB	60MB	60MB	120MB	120MB
LCD/Size	Backlit/8.85"	Backlit/8.85"	Backlit/8.85"	Edgelit/10.7"	Edgelit/10.7"
Video/Gray Scales	VGA/16	VGA/16	VGA/32	VGA/64	VGA/64
Power Management	• Suspend/Resume • Sleep mode • Low battery operation	• Suspend/Resume • Sleep mode • Low battery operation	*Premier System Management™* • Standby/Resume • Rest/Resume • Panic Save • Unattended communications	*Intelligent Power Management™*	*Intelligent Power Management*
Software	MS-DOS® included	MS-DOS included	MS-DOS pre-installed; Microsoft® Windows™ v. 3.0 included	MS-DOS and Microsoft Windows v 3.0 pre-installed	MS-DOS and Microsoft Windows v 3.0 pre-installed
Weight (with battery)	6.6 lbs.	6.6 lbs.	6.0 lbs.	15 lbs.	15 lbs.

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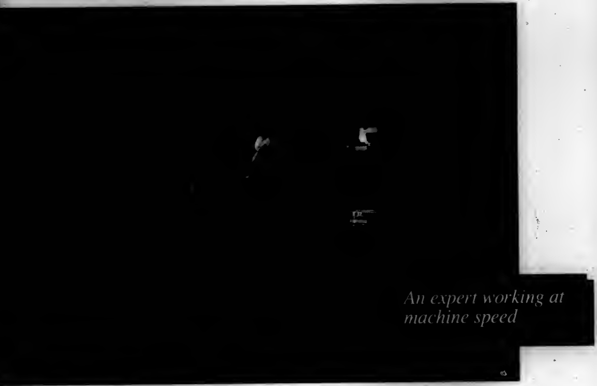
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EXECUTIVE REPORT

ARTIFICIAL INTELLIGENCE

AI (quietly) goes mainstream

Surprise — this overhyped software is finally getting a chance to show its smarts

Hudson's Bay's Love *says expert systems help the 450-store retailer keep up with a 'now business'*

BY BARBARA FRANCETT

Well, what do you know: Corporate America, it seems, is deciding that artificial intelligence might not be such a dumb idea after all.

After a decade of skepticism and hyperbole, AI has silently begun to slip out of laboratories and research groups into a host of big-business production applications.

"More companies are using these systems than people think," says Roger Jambor, system vice president of customer technology at The Dun & Bradstreet Corp. The Basking Ridge, N.J.-based firm recently installed an expert system in its Credit Clearing House Division that provides credit-rating information to small apparel manufacturers.

Earlier this month, some 3,600 people attended the American Association for Artificial Intelligence national conference in Anaheim, Calif., to gawk at the latest technologies and hear AI success stories from big names such as Northwest Airlines, Inc., General Dynamics Corp., Nippon Steel Corp., Du Pont Co. and others.

Increasingly, intelligent technology — mostly expert systems — is turning up in diverse industries. In many companies, the focus has shifted from experimentation to deployment. This shift promises a new, expansive role for information systems and gives new hope of survival to battered AI vendors (see story page 66).

> IN FACT, THE invisible flowering of AI may be one of corporate America's best-kept technology secrets.

In fact, the invisible flowering of AI may be one of corporate America's best-kept technology secrets. During the last two years, most Fortune 500 companies have put expert systems projects in place, according to a survey by "Intelligent Software Strategies," a San Francisco-based newsletter. Despite the recession, one-third of the firms say they plan to boost spending this year by an average of 43%. Other polls have shown similar high interest.

"The expert system fad may be over, but IS departments are just starting to expand their use of the technology," wrote newsletter editor Paul Harmon.

While AI is nowhere near being the multibillion-dollar boom industry prophesied in the early 1980s, analysts say sales are growing at a healthy rate of 20% to 30% a year. Estimated annual U.S. revenue totals between $300 million and $600 million.

Wait a minute — wasn't it just yesterday that AI was the province of wild-eyed academics-turned-entrepreneurs who gushed science fiction visions of "smart systems" that would flawlessly and wisely slave for their human masters? Was not AI the very embodiment of a technology that promised much but delivered nothing?

Changing scene

What happened here? Two main things, industry experts say. First, during the last few years, AI has of necessity shifted to mainstream computing platforms. The LISP machines and other specialized equipment of yesteryear are fading fast.

Today's knowledge-based systems run on multiple conventional platforms, from personal computers to mainframes, including Unix — all critical for mainstream computing.

Second, corporate emphasis has shifted from simply shoveling data to managing and automating business processes. This change has stretched the ability of older technologies, according to Joe Carter, a partner at Andersen Consulting in Chicago. The need for rapid development of huge, complex software applications "requires advanced technology," he says. "Cobol can't cut it."

Users have changed, too. "AI was a technology market," says Bruce Russell, vice president and division manager at Carnegie Group, Inc., a Pittsburgh AI vendor. "Customers would say 'I need AI — get me some.' " Now, Russell says, "Technology is secondary to problem-solving."

AI sellers have also sharpened up, Harmon notes. Instead of talking about technology, they now sell benefits and solutions. There's a growing

Continued on page 60

Francett is a free-lance writer based in Bloomfield, N.J.

Artificial Intelligence

KEY POINTS

- ▶ Led by expert systems, AI use has grown in large firms. Most Fortune 500 firms are said to be running AI applications.
- ▶ An expanded IS role is shaping up as AI is integrated with other information systems and technologies. But questions remain for users, developers and IS managers.
- ▶ Analysts say the AI market appears to be thawing after the 'AI winter' of recent years. North American sales in 1991 are forecast at $300 million to $600 million (see story page 66).
- ▶ Key steps in AI projects include applications selection, expert knowledge gathering, cost justification, project management and upkeep (see story page 64).
- ▶ Award-winning AI users, page 61.
Common AI questions answered, page 64.
AI resources, page 60.
AI association leader talks about the future, page 21.

▶ QUOTABLE:

"More companies are using these systems than people think."

Roger Jambor
The Dun & Bradstreet Corp.

Continued from page 59

realization, he says, that "people are interested in tools, not techniques." Other observers note that technological innovation has slowed, giving buyers a chance to absorb new developments and figure out how to use the products.

By the way, don't call it "AI." That catchall phrase, which used to cover everything from expert systems and neural networks to robotics and vision systems, is now passe in some circles. The preferred terms now are "knowledge-based systems" and "intelligent systems."

Major companies bite

The identity change seems to be working: Knowledge-based systems are becoming mainstream enough to attract major companies. Following are a few examples:

- At Hudson's Bay Co., a $6 billion Toronto-based retailer, more than 300 managers use knowledge-based systems for employee performance reviews, training, sales management, distribution and scheduling.

"Retail is a 'now' business," explains Robert Love, director of education, systems and administration of corporate human resources for the 450-store chain. "We need a short development cycle."

To speed projects along, the firm develops knowledge-based systems on PCs, then uploads them to the corporate mainframe for testing and production, Love says. Systems for sales analysis, buying analysis, credit services and collections and pricing systems are now in the works.

- American Airlines is fast gaining a premier reputation for its knowledge-based applications. The two largest, Maintenance Operations Controller Advisor and American Assistant Load Planner, have been in production since early 1990.

Lynden Tennison, American's manager of knowledge systems, is sold on using knowledge-based systems as a way to handle more work without expanding staff. "If a process relies on human decision makers, embed that expertise and leverage it," he advises.

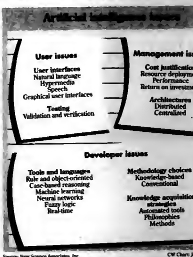
- The Ontario Department of Corrections uses a knowledge-based system developed by Andersen Consulting to determine prison sentences. Such variables as escape attempts, consecutive and concurrent sentences, parole violations, offenders' ages and credit for good behavior are factored into decisions.

"Rules and regulations change all the time," Andersen's Carter explains. The system helps the department keep current with myriad regulations, he says.

It's not hard for companies to love the big payoffs possible from using knowledge-based systems either. At Dun & Bradstreet's Credit Clearing House Division, an expert system has slashed software maintenance costs by between "three and 10 times," Jambor says. He adds proudly: "That's the biggest bang for the buck in rules-based systems."

The credit system also provides several business advantages, including higher quality recommendations, on-the-spot analysis and increased market coverage without increasing staff, Jambor says.

The gradual mainstreaming of AI applications promises a new but as-yet-undefined role for IS departments. Historically, IS has lacked the AI know-how needed for extensive involvement. By and large, smart projects today remain the province of specialized AI groups as well as end users.



Source: New Science Associates, Inc.

CW Chart: Janell Genovese

But just as the PC revolution impacted IS, many observers say, more IS groups will inevitably have to deal directly with AI before too long.

"An increasing number of IS organizations are absorbing AI software development functions," says Neena Buck, vice president and director of the applied intelligence systems research service at New Science Associates, Inc. in Southport, Conn.

New IS roles

There are two schools of thought about what role IS will play. Some experts suggest that IS will act as approver and integrator, facilitating standards, purchasing software and hardware and being the keeper of corporate data.

In this scenario, end-user groups will continue to take much of the responsibility for building and maintaining applications. Hudson's Bay is a good example of this approach.

"We use IS in the area where they are experts," Love explains. "IS keeps the software up and running. It also assists in development and in connecting business systems to mainframe data."

A second, slightly different view sees IS taking a much more active role in AI as companies downsize and restructure. Buck notes technology groups will now become part of larger applications development groups.

Either way, but especially in the second case, Buck and others say, IS will have to grapple with a large range of end-user, manager and developer issues (see chart above). Among them are selling the technology to skeptical programmers, integrating former AI missionaries and learning to accurately estimate projects.

Experts also say a bigger role for IS seems likely because the success of knowledge-based systems is seen as hinging on a close match between business goals and technology.

To get a jump on the future, some firms are gradually acquainting IS staffs with AI technology. American Airlines, for example, combined consultants and new hires versed in expert systems technology with seasoned members of its IS staff.

"Those from the 'airlines side' have done fairly well," Tennison says. "We're now moving the technology out to other [data processing] groups."

Dun & Bradstreet ran a pilot of its credit system for several months to acclimate its internal IS staff. Now the IS staff is building more knowledge-based applications, Jambor says.

New technological developments also make greater IS involvement a surety. As knowledge-based systems become more mainstream, they will need to be more integrated with other emerging technologies, such as image processing, client/server networks, computer-aided software engineering, objected-oriented databases and neural networks.

More adventurous corporations are also examining so-called case-based reasoning, which Carter calls "the hottest thing on the horizon." More explicit than neural networks, case-based reasoning uses inferencing and object orientation to look for patterns in past cases.

Connectivity needs

With such exotic technologies not far away, many say they believe that only IS has the technical expertise to smoothly hook them all together.

"Integrated [AI-based] systems are the wave of the future," says John Splavec, managing partner at Courseware/Andersen Consulting, a training, software and service firm.

When the demand for more IS involvement does indeed come, experts say, IS should be in better shape to respond.

The computing generation trained on Fortran and Cobol will turn over in the next five to 10 years, notes Harvey Newquist, president of Relayer Group & Productions, a Scottsdale, Ariz.-based consultancy. "The younger generation is more open," he says. "Academic programs now include courses on intelligent technologies."

That's good news because Carter and others say there's little doubt that intelligent technologies are destined to grow rapidly in the 1990s.

Some of industry's biggest names, including Digital Equipment Corp., Ford Motor Co., US West, Texas Instruments, Inc. and Carnegie Group, Inc., recently formed a group to create a standard for managing knowledge assets. Though some say the effort is premature, it's clear that adoption of such guidelines is only a matter of time.

For now, AI quietly continues to migrate from development groups into everyday applications in hopes of living up to its much ballyhooed past. ●

Partners

▶ Why IS needs AI. See Viewpoint, page 21.

Learn more about AI

ORGANIZATIONS:

- **American Association for Artificial Intelligence** — Holds an annual conference and periodic technical conferences; publishes a quarterly magazine and annual conference proceedings. Menlo Park, Calif. (415) 328-3123
- **American Society for Information Science** — Sponsors courses and conducts research. Silver Spring, Md. (301) 495-0900
- **Association for Sytems Management** — Publishes books and covers artificial intelligence issues in its magazine. Cleveland, Ohio (216) 243-6900
- **IEEE Computer Society** — Holds technical conferences and publishes two AI journals. Washington, D.C. (202) 371-0101
- **Society for Machine Intelligence** — Conducts research and sponsors technical seminars. Detroit, Mich. (313) 832-5400
- **Special Interest Group on Artificial Intelligence** (part of Association for Computing Machinery) — Holds an annual conference and publishes a quarterly newsletter. New York, N.Y. (212) 869-7440

PUBLICATIONS:

- ***AI Expert*** — Monthly magazine; $37 per year. (415) 397-1881
- **"AI Today"** — Bimonthly newsletter. $95 per year. (304) 965-5548
- **"AI Trends"** — Monthly newsletter. $295 per year. (602) 585-8587
- **"Intelligence — The Future of Computing"** — Monthly newsletter. $295 per year. (212) 222-1123
- **"Intelligent Software Strategies"** — Monthly newsletter. $367 per year. (617) 648-8700
- **"Intelligent Systems Report"** — Monthly newsletter. $249 per year. (404) 434-2187
- **"Neural Networks Today"** — Monthly newsletter. $95 per year. (206) 892-5880
- ***PC AI*** — Monthly magazine. $21.95 per year. (602) 439-3253
- **"The Spang Robinson Report on Artificial Intelligence"** — Monthly newsletter. $355 per year. (212) 850-6347

AI in action

Despite widespread experimentation, many information systems shops have limited experience in rolling out artificial intelligence production systems.

Computerworld **recently asked several standout organizations to share their techniques for handling different phases of AI project development. Earlier this month, all were recognized for their innovativeness by the American Association for Artificial Intelligence. Stories by Alan Radding.**

Choosing the application

General Dynamics Electric Boat Division

Deciding if an application is suited to AI is a key first step. Not every task is well-suited to intelligent systems, although groups sometimes seize on AI when conventional solutions fail.

Initially, General Dynamics Electric Boat Division in Groton, Conn., thought a database management system was the ideal technology for handling manufacturing nonconformances.

Like many large manufacturers, the nuclear submarine builder grappled with lost, defective or damaged parts. Stuart Brown, project engineer, describes the problem as "any situation that does not conform to a standard requirement."

Brown originally wanted to store information about specific problems in a database accessible to various project groups. Thus, each would not have to come up with its own solution every time.

Unfortunately, the idea didn't work. While the database let him store and access information about various nonconformances, "We didn't have any way to evaluate the results," he says.

The nonconformance problem looked like a good candidate for AI. It didn't hurt that Brown had research and development funding to explore the technology. "Over the years, we've attempted to push things into AI," he says.

Finding the right AI solution wasn't easy, though. The group first looked at an expert rule-based system. "We tried developing rules, but [the system] was too brittle," Brown explains. "If one rule was changed, we had to start all over again."

Eventually, it became clear that the rule-based system didn't work the same way as engineers tackling nonconformance problems did. Typically, engineers approached the problem by reviewing other, similar nonconformances.

"I didn't know at the time that it was called case-based reasoning," Brown says. Using the technique, Brown's group designed a system around similarities.

The team eventually developed a system that interactively asks users for information about nonconformance. It then searches its knowledge base of documented cases to find ones that come close and represent the best potential resolutions.

Brown might have wrestled a solution from the database approach, but he realized that the flexibility and ambiguity of the problem made AI a better choice.

If the system finds too many possibilities, it quizzes the user to narrow them. •

Making the business case

Sunamerica Financial, Inc. and Boston Children's Hospital

Because of their experimental nature, few AI projects are subjected to rigorous cost/benefit justification. Yet AI champions will increasingly be called on to prove a system's worth.

"We never looked at the AI application in itself but how it fit into the whole, overall redesign and restructuring" of the business and systems, says Frank Angrisani, president of Sunamerica Financial, Inc., the service company for Sunamerica Corp.

Two years ago, the Los Angeles-based insurer embarked on a major corporate re-engineering project to move into total paperless, image-based operations. It developed an AI application, the Appointment Expert System (AES), to handle the complex, regulation-intensive task of registering Sunamerica sales agents in different states.

When planning the project, the business case was made for the total re-engineering, not just for the AES.

Eventually, Angrisani says, the AES reduced by 85% the time needed to process an agent appointment and enabled a 70% staff reduction.

Sunamerica's Angrisani *(left) and staff: AI part of re-engineering whole*

"The payback is unbelievable when you integrate the AI application with everything else — improvements in quality, improvements in service, things you can't measure," he says.

A similar big-picture focus was taken by Children's Hospital in Boston. When pitching an AI-based just-in-time intervention system, backers stressed how the system fit into a total hospital information system before talking about specific medical and administrative benefits.

"The AI application has to fit into the overall systems infrastructure," says Ron Ribitzky, a medical doctor and director of the application information services department.

The expert intervention system draws on the hospital's other information systems to analyse combinations of information for immediate action, Ribitzky explains.

For instance, the system collects the results of a patient's lab test, recognises a change that presents potential problems with medication previously prescribed and then issues an immediate alert.

The AI component represented the final stage in a four-year, $25 million systems infrastructure development. The project began with basic systems connectivity and progressed to applications communications and finally to full integration.

Ribitzky, a Harvard University research fellow, sold AI to the medical staff on the basis of improved quality of care, but management needed more.

So he presented a strong business case, demonstrating how the AI application addressed cost and revenue issues. "They have to know what's in it for administration, too."

The plan worked. With the hospital already sold on the major infrastructure upgrade, AI was presented as just one of many new applications. •

Building the knowledge base

Nynex Corp.

Behind every AI application is the knowledge base. Building this base requires abstracting human knowledge and putting it into a form the application can use.

Nynex Corp. recently turned to an AI application, Max, to automate its telephone trouble-screening process. Building Max's knowledge base proved difficult because seasoned troubleshooters, called "testers," had long since been replaced.

Luckily, the Max team found Ed Power, a former tester who was also familiar with telephone company computerized switching systems.

Power came to the Nynex Expert Systems Laboratory in White Plains, N.Y., for three days of preliminary proof-of-concept studies — the first phase of what became a four-phase process of building the knowledge base.

Taking a case-based approach, the Max team presented Power with problems. He then explained how he would solve them and why. The team turned Power's responses into rules for an expert systems prototype, explains Jim Euchner, director of the Expert Systems Laboratory.

The second phase consisted of expanding the prototype into the fully functional system by broadening the knowledge base. However, "at one point, we were attempting to hard-wire too much," Euchner recalls.

The team tried to force the system to make a single determination in cases where Power saw multiple possibilities. "We decided to let it come up with multiple answers," he says.

Nynex's Max system relies on the know-how of seasoned troubleshooters to build its knowledge base

The third phase, an arbitration level, gave the system rules to use in selecting among equally valid possibilities. The fourth phase involved modifying the knowledge base for the particulars of the local service center.

Using local experts, the team altered the database, depending on the particular type of equipment in use and other factors. "There is a difference between Manhattan and someplace in New Hampshire," Euchner explains. "The knowledge base must be tuned for each service center."

The team may embark on a fifth phase, making the system self-tuning by identifying rules that led it to erroneous judgments and making changes on its own. •

Managing the project

Northwest Airlines, Inc.

Many AI applications are built in isolation by specialized teams and are exempt from standard IS project management. That is changing, however.

At Northwest Airlines, Inc., the expert auditing system for airline passenger tickets was largely managed as just another part of a mammoth Passenger Revenue Accounting System project.

The AI-based expert auditing system is responsible for checking that every ticket issued by the airline — as many as 60,000 daily — is properly priced and that the correct travel agent commission is applied.

The entire project was a joint effort by Northwest Airlines and Andersen Consulting in Minneapolis. Each part of the Passenger Revenue Accounting project had its own team that reported through its analyst to project manager Maureen Petersen at Andersen Consulting.

The AI group, however, reported directly to Petersen. This made sense, she explains, because there wasn't one person who could speak for all the parts of the AI project.

The biggest problem with managing the AI part of the project, Petersen says, was estimating how long something would take. She says the effort is more like guesstimating. •

Radding is a free-lance writer in Newton, Mass.

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Nearly everything you want to know about AI

An expert answers some of the most commonly asked questions about artificial intelligence

BY HARVEY NEWQUIST

• What is artificial intelligence?
AI is a group of technologies that attempt to emulate certain aspects of human behavior, such as reasoning and communicating, as well as to mimic biological senses, including seeing and hearing.

Specific technologies include expert systems (also called knowledge-based systems), natural language, neural networks, machine translation and speech recognition.

• What types of applications are best suited to AI?
Problem areas that are objective and can be broken down to specific components are usually best. Because expert systems attempt to be precise, they work well in applications that have a defined outcome (or related set of outcomes).

An expert system can provide straightforward answers such as, "The engine will not start because intake valve A is clogged," or "The patient qualifies for insurance reimbursement according to Plan B." Subjective questions, such as those dealing with personal opinions, aren't well suited to AI applications.

• Who typically pays for development of a project? And what is the average cost?
In the early days — about 10 years ago — options were limited and expensive. You needed a fully configured LISP machine, which cost up to $250,000; LISP development software, which cost from $50,000 to $100,000; and the services of a knowledge engineer as well as assistance from an AI vendor. Typical total cost was over $1 million, and development usually took about two years.

Today, it's much less complex but also much less cut-and-dried. In large companies with AI experience, dedicated groups that are either within the information systems department or part of a technology transfer organization oversee the development and maintenance of AI projects.

High-level IS management of an AI project is more prevalent in companies that have mainframe or local-area network-based expert systems. In other companies, an end user or manager might be responsible for AI-related tasks.

The cost is also relative to the size of the project. Du Pont Co. uses personal computer-based software, which costs about $500 per copy, to develop AI throughout the entire company, while Ford Motor Co. is spending millions to develop a service bay diagnostic system it will ultimately deploy to its dealerships.

Mainframe AI software obviously costs more than workstation software, and it requires more customer service support from the software vendor.

• How many people are usually involved in developing an AI system?
Again, this depends entirely on the experience level. Users with little or no programming experience can develop expert systems with many of the PC-based expert systems tools without having any outside help. Large systems that integrate into CICS or access large corporate databases require more than a dozen people. AI groups at larger companies may have 50 people, while one person may be the AI development expert at smaller firms.

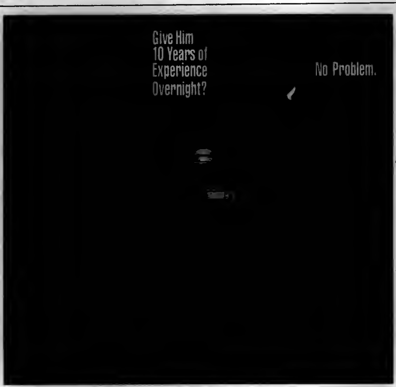
• What is a knowledge engineer?
Traditionally, a knowledge engineer was a combination programmer, psychologist, interviewer and analyst who met with the human experts and then programmed their knowledge into the expert system. In the early AI days, the knowledge engineer was glorified as someone who could ask all the right questions, learn all the pertinent facts and then hack all that knowledge into LISP code to create an intelligent machine version of the expert.

Today, with better interfaces on many of the expert systems as well as the use of more conventional programming languages such as C, the idea of needing one person to "do it all" has been downplayed.

While knowledge engineers still serve a purpose in creating complex systems, many of today's smaller and less esoteric programs can be programmed by end users, who may be using their own expertise as the basis for the application.

• What is the biggest risk in starting an AI application?
Probably the biggest risk is in expecting an intelligent application to solve every problem every time. More than anything else, what killed more of the original AI prototypes were overly high expectations: Management thought a wonderful stand-alone application would replace whole levels of personnel, solving problems ranging from pension and payroll to how to get the employees to dress better.

It's always best to start with specific, solvable problems. If one component of a problem can be addressed satisfactorily, the system can eventually grow to address more areas. But keeping it focused and easily manageable at the outset is the best way to minimize risk.



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• How does the development of an AI system differ from other systems development?
It's not that different. The tools are certainly different, and the use of active relationships (if/then statements, procedural logic and symbolic representation) is different conceptually, but the concerns regarding maintainability and portability are the same as they are in the development of any other program.

The biggest difference is that the programmer must conceptually address the application as something that is going to be an active provider of information as well as being interactive with the user. That's a big leap of faith from creating static or passive applications.

• How long does a typical AI project take? On average, how many rules does it include?
Some expert systems have been in development for seven years and still aren't finished, while others have been built from start to finish in one working day. These are extremes, but most expert systems can be built in a six-week to six-month time frame.

The majority of expert systems used in corporate America employ fewer than 100 rules. Systems don't have to be as tremendously large as was once thought in order to address well-defined problems. The largest expert systems, though, such as those developed by Digital Equipment Corp. and Ford, have well over 10,000 rules and are still growing.

• Who is typically in charge of maintaining the system after it is developed?
Because widespread use of expert sytems is still in its infancy, that question hasn't been significantly addressed. The responsibility right now is falling on the developers' shoulders, simply because they are intimately familiar with the program.

In more sophisticated user organizations, IS is taking on a larger role, adding expert systems to its list of applications that must be maintained. This is more the exception than the rule, however, and maintenance is definitely the biggest issue still needing to be addressed by companies developing expert systems.

• Who is legally liable if an AI system makes a bad decision, causing damage to a company or a person?
Since the U.S. legal system seems to hold that "if you can sue somebody, you should," it's possible that the following would all be held responsible: the company using the system, the programmer who developed the system, the vendor who built the expert systems tool and the original expert whose expertise was used.

On a more practical level, the U.S. legal system has not yet made any provisions for dealing with intelligent machines; it's still trying to figure out ownership of interfaces.

Given that they are already years behind in addressing very obvious and even mundane questions relating to software, it will be quite a few years before the lawyers and the courts get around to tackling decisión-making programs. Perhaps the best way to obviate any problems is never to let AI take the place of humans in situations that could result in certain forms of injury or damage. Right now, expert systems are best used primarily for routine processes or as assistants to human workers, not as almighty controllers.

• When is it best to work with outside consultants in developing an AI application?
Any company that wants to build a large system and has no experience with AI needs to hire consultants or the professional services group of the AI vendor whose tool is being used for development. Even a company developing a midlevel system might require outside help if it has no internal AI experience, especially for those applications that access corporate data via personal computers or workstations.

Small, single-user personal computer systems are often straightforward enough to be handled internally by someone who is familiar with the technology.

By and large, first-time, large-scale users will always require outside assistance. For others, user sophistication and project size determine how much consulting — if any — needs to be brought in.

• Will there be AI standards anytime soon?
One group of companies has already banded together to develop an expert systems standard, although its progress hasn't been overwhelming.

DEC, Ford, US West, Texas Instruments, Inc. and Carnegie Group, Inc. have formed the Initiative for Managing Knowledge Assets (IMKA) in an attempt to create some basic standards for the AI community based on work they've done together. However, I feel it's too early for the AI industry to have any standards, since the user community hasn't had the time to truly evaluate all of the methodologies for expert systems development.

In this sense, IMKA isn't a true standard; it doesn't have the benefit of time or end-user support to give it credibility over other forms of expert systems development. More years of mass-market deployment would establish a truer standard than the establishment of a de facto standard that isn't market-proven. •

Newquist is publisher of the newsletter "AI Trends" and president of Relayer Group & Productions in Scottsdale, Ariz.

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Experts say AI freeze is beginning to thaw

BY CHARLES BURTON

In the late 1980s, "AI winter" described the state of the artificial intelligence industry: cold, dark and dying.

Today, however, there are signs of thawing. Not every company has revived, and several have died, but industry watchers are nonetheless cautiously predicting a better climate.

Things could hardly have gotten worse. In the last few years, several big AI vendors have left the business. Others slashed staffs by up to 90% in desperate bids to stay afloat. According to Technologic Partners, a New York consultancy, venture capital investments in AI plummeted from $65 million in 1985 to zero in 1989.

Interest remains

Despite these setbacks and the near-fatal hoopla that has surrounded AI for the past 20 years, some say significant information systems interest in expert systems and other AI technologies remains. Outside investments have begun to inch up again, and most of the Fortune 500 companies are exploring AI technology.

Paul Bloom, vice president of investment banking firm Volpe, Welty & Co. in San Francisco, describes today's AI market as "underpenetrated."

"Intelligent Software Strategies," a San Diego-based newsletter that covers AI, computer-aided software engineering and other new technologies, recently wrote: "Despite the recession, we heard more enthusiasm . . . from companies currently using expert systems than we have in the last five years."

Editor Paul Harmon predicts the best companies will enjoy growth of 40% in 1991 and 50% to 60% in 1992.

The industry's health, of course, is vitally important to the military — a huge AI backer — and to U.S. corporations, many of which are expanding AI initiatives. Few, if any, would be willing to invest heavily in a technology with an uncertain future.

While most industry watchers and vendors say things are looking up, agreement ends there. Opinions differ about market size, growth, leading vendors and even how to define product groups (see story below).

A big problem in obtaining financial results is that only one major vendor, AI Corp. in Waltham, Mass., is publicly held. Another confusing factor is the newness and complexity of the technology, which makes precise segmentation difficult.

A couple of things are certain, however. For starters, the mid-1980s projections of a $4 billion to $12 billion market by mid-decade are pure fantasy. Current estimates of annual North American AI sales range from $300 million to $600 million, with most analysts predicting a 20% to 30% growth rate through the end of the century.

Second, industry watchers agree that expert systems development tools (also called knowledge-based tools) are the hottest item on the market, accounting for the majority of AI sales. Other infant AI technologies such as neural networks, machine translation and voice recognition aren't expected to take off anytime soon (see chart at right).

New vendor directions

For their part, AI vendors are changing their marketing approach. Aion Corp. in Palo Alto, Calif., for instance, is going after Fortune 1,000 companies, according to President Jim Gagnard. "The [AI] vendors that are going to be successful are those whose systems fit well into those environments," he says.

Others are hoping to hit the mainstream by offering tools for popular platforms. Neuron Data Corp., for example, is offering tools that can be ported across multiple architectures.

Inference Corp. in El Segundo, Calif., is focusing on workstation and mainframe environments, continuing a shift away from LISP begun in 1989, says Chuck Williams, co-founder and chief technologist. A recent infusion of $5.5 million by an investment group headed by the J. P. Morgan & Co. bank is viewed by some as a vote of confidence in the company and in the AI industry.

Partnerships are also big. Digital Equipment Corp., for example, has struck marketing agreements with other major vendors in the industry, including Aion, Neuron Data and Carnegie Group, Inc.

AI Corp. has carefully nurtured a relationship with IBM users, says Harvey Newquist, publisher of the newsletter "AI Trends" and president of Relayer Group & Productions in Scottsdale, Ariz. IBM, not a major player, is expected to offer a new expert systems product in 1991 that some say will give Aion and AI a run for their money.

Such market shifts are necessary for continued AI industry growth, according to Neena Buck, vice president and director of the applied intelligence systems research service at New Science Associates, Inc. in Southport, Conn.

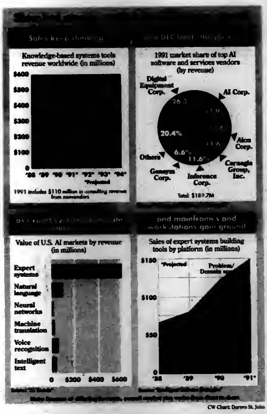
Makers of LISP-based standalone systems have borne much of the brunt of falling sales and needed a new approach, she says. These high-priced systems fell from favor as users began demanding tools for standard platforms, wanting to integrate knowledge-based applications into existing systems. LISP Machines, Inc. was one such casualty.

Late last year, Syntelligence, Inc. in Sunnyvale, Calif., filed for Chapter 11 bankruptcy protection. Intellicorp, Inc. is also in danger, says Sara Hedberg, editor of the "Spang Robinson Report on Artificial Intelligence." The Mountain View, Calif.-based firm moved too slowly away from LISP. As a result, the company recently suffered a 50% revenue drop and is a strong candidate for a merger, according to Hedberg.

Overall, IS can expect to see continued vendor shuffling over the next year or so. "We're going to see some major changes," Newquist says, "as the 'pure-play' vendors get shaken out or get acquired."

Yet nobody anticipates that IS and the products it purchases will go unsupported. "The technology behind it is too powerful and beneficial for that to happen," Bloom says.

Burton is a free-lance writer based in Jenkintown, Pa.



CW Chart: Doreen St. John

Who's the AI leader? It's tough to figure

Who's the top AI vendor? Getting a precise answer requires some flexible reasoning.

Some market analysts count only "pure-play" vendors — in other words, those that sell only AI. Others look strictly at AI revenue, regardless of whether AI is the vendor's sole business. Thus, opinions about market leaders differ.

"The Spang Robinson Report on Artificial Intelligence" puts Digital Equipment Corp. on top. By its reckoning, DEC holds a 26% market share — with an estimated $50 million in AI revenue, largely from consulting — for 1991. "AI Trends," a Scottsdale, Ariz.-based newsletter, says about 30% of the market is held by 11 "pure-play vendors" — those selling only expert systems tools and/or consulting services.

Of those vendors, Cambridge, Mass.-based Symbolics, Inc., one of the early players in the LISP market, is expected to net the most revenue in 1991 — an estimated $44 million. That's a big drop, however, from the $114.2 million the company earned in 1986.

Projections for other pure-play vendors include $23 million in revenue for Alpnet, Inc. (Salt Lake City); $22.5 million for AI Corp. (Waltham, Mass.); and $18 million each for Aion Corp. (Palo Alto, Calif.) and Carnegie Group, Inc. (Pittsburgh).

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IS architecture artistry

Architectures can make planning and systems changes a whole lot easier. Here are 10 lessons to keep in mind when formulating one of your own

BY GLEN GAGE

Just as a builder would not break ground on a megadollar housing project without an architect's plans, it wouldn't make sense for companies to add information system on top of information system without an architecture in mind. In fact, the rickety structure created by such haphazard building can bring your IS house tumbling down. An IS architecture helps avoid such a dire outcome.

By understanding what IS architectures are and what benefits they provide, IS managers can align technology and business objectives and have a means to communicate those objectives to the entire firm. An IS architecture is a critical success factor in optimizing the use of information technology.

The beauty of an IS architecture is that it provides a relatively stable framework within which IS development, procurement and implementation activities can occur.

An IS architecture also ensures agreement and understanding within the organization of which applications, data and interfaces are the targets for implementation within a specified time. This controlled growth minimizes duplication of effort and promotes systems compatibility, interconnectivity and integration.

James Kaczman

An architecture also provides enough information to begin project definition and systems planning. (For an idea of what an IS architecture should consist of, see story on page 68.)

While some companies have succeeded without having one, an architecture makes dealing with certain business forces and problems easier. Companies need IS architectures because they help them deal with the increased complexity of business, the increased scale of integration required across applications, the need to ensure the integrity of distributed development and the need to implement systems incrementally.

However, there is an even simpler reason: An IS architecture makes economic sense. By having a blueprint in place for systems, development and so on, a company avoids the costs of launching the wrong projects or of building applications systems that won't integrate.

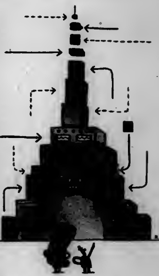
For example, in the services division of one manufacturing company, the IS staff was developing three applications: One to handle the installation of newly sold equipment, one to handle problem reports from customers and one to schedule normal service calls.

One of the discoveries uncovered in the architectural process was that all of these applications had a common need to schedule service personnel and dispatch them to customer sites. By consolidating this functionality into a scheduling server, the development groups saved considerable effort, the division avoided duplication of data and applications software, and users received a system that consolidated service efforts in a particular geographic area.

Putting an architecture in place should be a key priority for companies, but reaching that goal is not a cakewalk. In my six years of working in this area, I've learned the following 10 lessons that can help others in their architecture formulation:

■ **You don't need to know where you are until you know where you want to go.** If you're in Los Angeles and decide to go to New York, all you probably need to know is how to call your travel agent and how to arrange a taxi to take you to the airport. You don't need a detailed road map of L.A., and you certainly don't need a detailed atlas of the U.S.

Unfortunately, companies spend hundreds of thousands of dollars on detailed studies that basically amount to no more than an inventory of every piece of hardware, systems software, applications, databases, communications gear and so on. They than take these volumes of documentation, try to use them for planning and eventually place them on a shelf somewhere to gather dust.



Gathering such detail is, in most cases, a waste of time and money. The key is to take inventory only of what's needed and to gather inventory data that will help you assess the difference between where you are today and where you want to be tomorrow.

For instance, a utility company's key objective was to lower its cost of providing service to new customers. Business managers determined that one way to do so was to revamp the construction process, which included marketing, engineering and construction departments. Therefore, there was little use for a complete inventory of systems supporting other parts of the company.

■ **IS architects usually remodel.** Migrating from one application, database management system or hardware platform to another is frustrating, full of unforeseen problems and hard work. Implementing an IS architecture is analogous to rebuilding your house — an old structure that has been added to in a hodgepodge manner — to make it a new, modern, energy-efficient structure, all while you're living in it.

Continued on page 68

Gage is a management consultant at Digital Equipment Corp. in Portland, Ore., focusing on information systems architectures. The views expressed in this article are his own, not DEC's.

Continued from page 67

Such an implementation must be well planned. You need to change the vital pieces first to ensure that the foundation can hold the new work and that you don't get an frustrated with all the mess that you cancel the effort.

An architecture will help determine the level of compatibility you need among your systems and which incompatibilities are worth eliminating. Architecture does not make the job of getting systems to work together less technically demanding; it helps you pick your battles. Through standards — whether industry, de facto or company-specific — an architecture guides an IS staff.

Keep in mind that a full architecture implementation will take some time, and needs, materials and methods may change as the project progresses. You should stay on top of the effort to ensure that the remodeling project stays current with the changing situation.

■ **Architecture needs to be institutionalized.** In the same way that data management was not a onetime effort ("Just define all the corporate data and their relationships once and then implement applications around them"), formulating an IS architecture is an ongoing process. Therefore, architecture should become a core part of IS work, alongside operations, development, support and data management.

This institutionalizing of an architecture will take different forms, depending on the company's culture and organization. At minimum, however, there needs to be an ingrained process in place to keep the developed architecture current, to extend it into areas not yet covered and, most importantly, to make sure it is used.

■ **Architecture is valuable only when it is used.** To achieve the business and technology benefits architectures can bring, you need to plan how the architecture will be used and by whom.

Information architectures are useful at many levels of the organization. IS steering committees, which are made up of business and IS people, use them to understand the potentials and constraints of information technologies, set investment strategies, gain a more predictable environment and make technology an integral part of their business processes.

IS managers use them to increase their planning horizon, organise their teams better, provide stability through a common direction, and common standards, communicate with other IS and functional managers and aid in making purchasing decisions.

Project managers use them to reduce conflicts over turf, bound the scope of their efforts and decrease the time it takes to launch and complete their projects.

■ **While it may seem as if information architecture is the tool to solve all problems, it is not a savior.** Just as structured techniques, data management, end-user development and reporting to the chief executive officer instead of the chief financial officer did not make IS life a bowl of cherries, neither will architecture. However, these past changes have made IS a better contributor to the organization.

Putting an IS architecture in place will do the same thing, but it needs to find its place among all the other disciplines and tools IS brings to bear when implementing information technologies in an organization.

One lesson learned from the past is that it is very difficult to implement a new technology (a new anything, for that matter) without the acceptance of the organization. Architecture, because of its wide implications, must address organizational acceptance as a first step. In fact, an architecture must be based largely on what the organization will accept.

■ **Architecture is principled.** An architecture must be based on principles that state the organization's technology values and beliefs in clear terms. These principles vary within an organization. For example, finance may believe in using well-proven technologies, while engineering may believe in using leading-edge technologies. The extent of agreement on principles will determine the extent to which a common architecture can be achieved.

Many a great solution has gone unimplemented because it ran contrary to the values or beliefs of a company. Take, for example, one project that required providing management information to multiple levels within a company. It had a fairly simple architecture: Collect the operational data at the lowest level, transmit summaries to the next level and summarize further for the next, on up to corporate. This design minimized data transfer, left the data available locally for local reports and met user requirements. Yet it was thrown out because corporate demanded all of the operational data an it could "tell them how they did."

Data as a corporate asset in this company meant "Data is a corporate asset, and corporate doesn't trust anyone else with it."

■ **Architectures cannot be purchased; they must be achieved.** Defining, using and implementing architectures are not qualities you can purchase off the shelf. As companies move up from very technical architectures that contain a lot of generality in their requirements (say, a network architecture) to the more business-process architectures that need to account for intangibles such as values and beliefs (say, order fulfillment and product introduction), the architecture becomes more and more unique to the target organization.

The organization must be committed to the architecture and willing to put the processes in place to manage and use it. Too often, architecture efforts get bogged down in detail without delivering anything, sometimes holding up valuable work that is waiting for the architecture.

■ **We need One-Minute Architects.** Architectures should be created in small, incremental, value-adding steps. In this way, architects can ensure a quality architecture and time to integrate changes into daily operations.

■ **Conway's Law can be used to advantage.** Conway's Law, paraphrased, states that organizations are doomed to build information systems that reflect the communications structure of those organizations.

The result, in some cases, is information systems that are not resilient to changes in the organization. Because a good portion of architecture is related to structure (both data and process), it is possible to turn the table on Conway's Law and organise the development process around the structure of the architecture.

A well-structured architecture protects IS investments by buffering them against changes in the business and supporting technologies. By structuring the development process around the more stable parts of architecture — data and business processes — the development organization and resulting systems are more resilient to changes in the business.

The price paid for increased interdependence is more than made up through reusability, the elimination of redundant effort (and code) and the ability to withstand change.

■ **An architecture is built on a paradigm.** Similar to values but with a stronger effect, an organization's paradigms will shape an IS architecture.

A paradigm is a model that frames the way we look at the world. The von Neumann model of computing spawned many architectures that in turn spawned many implementations. Parallel processing is spawning new architectures. What is your paradigm — product-driven? data-driven? object-oriented? client/server? applications? process-driven?

The IS architectures you build will be based on your company's world view. •

When designing an architecture, consider what, how, for whom

The main point about an architecture is that there is no one correct way to go about designing and implementing one. In fact, even the extent to which there is an architecture mission statement will depend on whether the organization is a formal or an informal one.

There are three basic dimensions every company should cover when planning to put together an IS architecture:

▶**What is being architected.** Your planning sessions should pinpoint the information, processes, technological infrastructure and organization that will be part of your architecture.

▶**How to go about implementing it.** At minimum, you need to specify for each of the categories mentioned above principles that embody what the organization believes. For example, "Data is a corporate asset, and access to it is on a need-to-know basis only" vs. "Data is a corporate asset, and access to it is restricted on an exception basis only."

In addition to principles, you may want to develop models, which show the business and technology components and their relationships; objectives, which tell the IS staff why one or more components are being used; and standards, which allow the IS staff to assess whether components meet specified criteria.

▶**Who the audience is.** The level of detail, breadth and communication techniques one uses when communicating the architecture will vary from audience to audience. Audiences fall into categories of those who will fund and approve IS investments, those who will use the results of the IS investments, those who must manage the development and acquisition of the components, those who must design and select the components and those who must build and implement the resulting systems.

GLEN GAGE

Answers for architecture critics

There are those who will make arguments against the need for an architecture. Here's what they'll say, and here's how to respond:

Argument: Architecture is overhead.
Response: Yes, architecture is overhead — at first, while IS and business managers are planning and developing it. But overhead is reduced once decisions have been made about what is to be architected, what technologies are involved, how to go about implementing the plan and who will be affected. Such a blueprint will facilitate the decision-making process.

Argument: Architecture implies bureaucracy.
Response: Some call it bureaucracy, others call it control over what in some companies is a [illegible].

Argument: An architecture will delay current efforts to deliver functionality to users who needed it yesterday.
Response: Rather than delay current efforts, an architecture helps IS deliver the right functionality (aligned with business objectives) and one that changes as quickly as possible as user requirements change.

Argument: Technologies and businesses change too fast to have an architecture.
Response: Architectures attempt to exploit change by defining technology components and their interfaces so that new technologies can replace old ones with minimal impact on the overall system. They also enable the system to more readily respond to changes in the business — who reports to whom, where users are located and what process they use to achieve business objectives.

Argument: We want to buy, not build. We want to stick to one vendor. Architectures go against these plans.
Response: Architectures are what you make them. These statements are the principles that should form the basis of this particular company's architecture.

NATIONAL BRIEFS

Back in court

▶ **IBM Credit Corp.**'s (ICC) lawsuit against third-party computer leasing player **Comdisco, Inc.**, which was last seen on its way out of the Delaware Chancery Court for lack of jurisdiction [CW, July 22], is back — and with a twist. As amended and refiled in Delaware Superior Court, the complaint is narrowed to very specific Comdisco reconfiguration practices. It is also broadened to include Comdisco customer **Computer Associates International, Inc.** as a defendant. This is ICC's first legal move against a user, a tactic that Comdisco contends is indispensable to maintaining the suit. Both reshapings, ICC President **Harry Kavetas** maintained, aim at the same goal: easing the court's way to a speedy decision.

Sybase, public at last

▶ **Sybase, Inc.** is about to make honest men and women out of the many analysts and industry observers who for years have singled out the Emeryville, Calif.-based database maker as one of the technology firms most likely to go public in the near future. This year, the analysts will finally be right. Sybase announced last week that it expects its initial public offering to commence in the middle of August. The firm anticipates an offering of 3.5 million shares of common stock, priced at $10 to $12 a share.

More briefs on page 71

Companies survive by going beyond ISDN

BY JOANIE M. WEXLER
CW STAFF

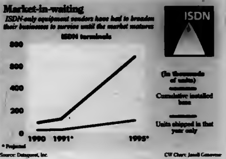
Several vendors once banked on the promise of Integrated Services Digital Networks (ISDN). Those that did that are still registering a pulse say it is because they have de-emphasized technology and have tweaked their product lines to embrace the spectrum of digital public networking beyond ISDN.

For example, privately held Teleos Communications, Inc. in Eatontown, N.J., and Ascend Communications, Inc. in San Francisco said they did recent "marketing sanity checks" and found no ISDN market in existence — at least, not as such.

What customers are looking for, they said, is cheap access to the myriad services now offered in the public switched digital network. ISDN is likely to provide that low-cost access if the service is available from a customer's local telephone company, the firms said.

This fresh back-door attitude toward ISDN has the companies surviving by offering both ISDN and non-ISDN digital access products.

"ISDN start-ups originally banked on the widespread acceptance of [the concept] and thought the ISDN terminal was the essential missing ingredient," said Berge Ayvazian, vice president of communications research at The Yankee Group, a consulting firm in Boston. "What they found was that they needed to tie their development to other market activities. [They didn't have the deep pockets] of switch vendors or other huge companies that needed ISDN in their portfolios but could afford not to make money off it for a long time."



Source: Dataquest, Inc.

CW Chart: Janell Genovese

Onetime ISDN player Vadia, Inc., founded in 1988, could not hold out. The company sold its line of ISDN terminal adapters to

Continued on page 71

Fujitsu lets air out of TI's patent plan

BY NELL MARGOLIS
CW STAFF

Japan's largest — and the world's second largest — computer company flexed its patent muscle earlier this month and put a dent in Texas Instruments, Inc.'s patent revenue plans.

Both firms are keeping mum about financial details of the recently signed five-year cross-licensing deal between Tokyo-based Fujitsu Ltd. and TI. However, a release issued by Fujitsu described the periodic payments the agreement requires it to make to TI as being "much less than under its previous four-year patent, which expired Dec. 31, 1990."

The scaled-down pact "reflects the strength of Fujitsu's patents," which now number an estimated 1,000 in the U.S. and 3,000 in Japan, Fujitsu director Mikotaro Masunaga said.

Out of shape

The stemming of the Fujitsu royalty stream catches TI with its profits down, underwhelming revenue growth and massive work force cuts — voluntary and otherwise — about to begin. For the quarter ended June 30, the Dallas-based firm posted a $157 million net loss on revenue up 6% to $4.6 billion. The quarterly loss was swelled by a $130 million reserve set aside to fund a cost-reduction program that will be the severance of an estimated 3,200 employees worldwide.

The new licensing agreement covers substantially all Fujitsu and TI semiconductor patents. Conspicuously missing, however, is the so-called "Kilby" patent (TI Japanese patent 320,275), TI's Japanese patent on the invention of the integrated circuit.

According to Fujitsu, this patent is outside the scope of the agreement because the technology it describes is no longer used in Fujitsu manufacturing processes. TI disagrees. A judge is likely to make the call: Fujitsu is seeking legal confirmation "that the Kilby '275 patent does not apply to Fujitsu's products," Masunaga said. TI "will seek damages and injunctive relief through litigation" filed in Japan, according to Chief Executive Officer Jerry R. Junkins.

TI has spent the past several years building its patent-holder status into a profit center. Vigorous pursuit of this highly publicised strategy has also meant repeated trips to court for TI, first as a plaintiff zealously guarding its patent capital and more recently as a defendant in suits brought by firms that view TI's zeal as excessive.

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Speculation runs wild on potential desktop pairs

BY PATRICIA KEEFE
CW STAFF

Who's doing what on the desktop — and with whom?

Guessing the answers is rapidly turning into a growth industry of its own, as frenzied partnering throughout the desktop software industry has incited exercises in matchmaking among market watchers and developers alike.

The microcomputer software market is already controlled by a relatively small number of vendors and is expected to shrink even further as market consolidation continues. According to Software Publishers Association (SPA) executive director Kenneth A. Wasch, four firms alone control 56% of the market.

In the domestic desktop applications market:
- **Top four firms account for 56% of the market.**
- **Top 11 firms account for 79%.**
- **Top 18 firms account for 85%.**
- **Top 34 firms account for 92%.**

(Based on 140 personal computer application vendors selling into horizontal market.)

Source: Software Publishers Association

Like some other analysts, International Data Corp.'s Nancy McSharry said she worries that the personal computer software market will soon look like the U.S. auto market, featuring "The Big Three" and a bunch of disappearing others. "I hope not — but it could happen," McSharry said.

Whether consolidation in the microcomputer market will even approach the state of the auto industry is anyone's guess. But a survey of industry pundits turned up the following list of companies likely to play a role in the continued shrinkage of market players.

Probable raiders, selected primarily on the basis of perceived holes in their product lines, included the following:

- **Borland International, Inc.** needs a robust word processor now to round out its applications suite, several analysts said. It got a package with negligible market share from Ashton-Tate Corp. and is said to be working on an object-oriented word processor in-house.
- **Symantec Corp.** is up front about being on the prowl for good software, particularly utilities, said Jesse Berst, editor of "Windows Watcher" newsletter.
- Both **Lotus Development Corp.** and **Microsoft Corp.** are said to need a database engine, even though Lotus has firmly stated it does not need one. Lotus killed an internal project a while ago, while Microsoft is said to be beta-testing its long-rumored project. **Novell, Inc.** is also said to be in need of a database management system.

On the flip side, companies that are vulnerable — because they are too reliant on one product, have encountered technical problems or have other difficulties in integrating earlier acquisitions of their own — include the following:

- **Software Publishing Corp.** (SPC) just finalized its acquisition of Precision Software, a database maker. SPC's Infoalliance package reportedly has not caught on, and its attempts to position itself in a number of markets have yet to pay off. It is still very dependent on Harvard Graphics, which is under increasing competition.
- The word on the street about **Wordstar Corp.** is that Chief Executive Officer Ron Posner is doing a super turnaround job. Analysts said industry veteran Posner was brought in specifically to whip the company into salable shape.
- Most of the database companies make good candidates, said Rich Finkelstein, a consultant at Performance Computing, Inc. **Fox Software, Inc.** is an attractive candidate and, like some of its competitors, may be more amenable to a buyout now that it has to compete against the combined strengths of Dbase and Paradox in the wake of the Borland/Ashton-Tate nuptials, he said. Other developers said to be having problems include **Datacase International, Inc.**, which recently cut back on staff, and **Nantucket Corp.**, which is still smarting from quality problems with its Clipper 5.0 development tool, he said.
- Any decent mail technology could make a good pick, analysts said, such as **Action Technologies** in San Jose, Calif.
- Graphics packages also loom large among the speculations. Two leading players, **Micrografx** and **Corel**, reportedly have thus far resisted buyout offers.
- Pen-based computing firms, such as Go Corp., may find it hard to pitch new standards on their own.

Then there are companies on the fence, such as **Wordperfect Corp.**

Orem, Utah-based Wordperfect is a privately held firm that appears to have little interest in buying or being bought. While the company has a family of products, none are market leaders except for its namesake word processor. Wordperfect's inability to bring out a Windows version of its word processor reportedly has begun to hurt sales. Wordperfect could go public, stick it out, focus on word processing or agree to a merger, analysts said. The firm's entrenched corporate culture and relatively remote location could pose problems for would-be buyers, they said.

Senior editor Nell Margolis contributed to this report.

Will innovation suffer?

Despite rampant merger activity, with its potential for spawning a handful of giants, most industry observers maintain that innovation will not suffer in the desktop software industry.

It is true that small developers may find it hard to gain entry into IS shops seduced by applications suites from industry heavyweights. "That's my one fear in a situation that is otherwise very healthy for firms and for their customers," said Kenneth A. Wasch, head of the Software Publishers Association, an industry organization based in Washington, D.C.

It is also likely that a strapped retail channel may be less willing to bet on small players.

Even if such impediments arise, however, new and small firms will not necessarily find their success blocked, analysts said. Although Basil Maloney, director of the Windows/Presentation Manager Association, maintained that developers need about $2 million to market a "cheap" application, others insisted that the days of garage shop developers are not over.

Several established developers suggested that applications can be launched with as little as $500,000; a utility, with about $100,000.

There were 10 Windows development tools before the release of Microsoft Corp.'s Windows 3.0; now there are something on the order of 160 to 180 such tools, according to Jesse Berst, editor of "Windows Watcher" newsletter.

PC software is still a cottage industry, added C. J. Lawrence analyst Mary McCaffrey. "For every one company that disappears, five more appear."

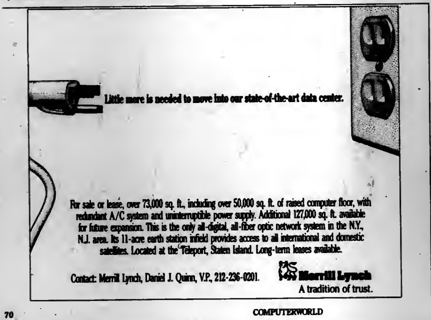
It may happen that some of these tools suppliers, as well as a host of other struggling three-programmer shops, will serve as incubators for the software giants.

Montgomery Securities analyst David Bayer predicted an emergence of what he called small research and development boutiques cranking out software for sale to larger developers. In this scenario, small developers will build applications, test them in a few prominent accounts, win orders and then peddle the software and promised contracts to bigger firms, he explained.

What is expensive, Bayer and McCaffrey said, is building distribution channels.

The current combination-mania advancing across the market offers yet another option for small development shops: the chance to be bought out by bigger developers. "There are a lot of neat little applications out there, particularly in the multimedia, groupware and mail categories," McCaffrey said. "I expect many of those companies will get swept up in an acquisition wave at some point."

PATRICIA KEEFE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INTERNATIONAL BRIEFS

Putting heads together

▶ **Read-Rite Corp.** in Milpitas, Calif., will manufacture and market its thin-film recording heads in Japan — with assistance and capital from Japan's **Sumitomo Metal Industries Ltd.** Sumitomo made an undisclosed investment in Read-Rite, and the two companies formed a joint venture to produce the heads in Osaka, Japan.

Doing the continental

▶ **Digital Equipment Corp.** has formed a single division to handle support and integration across Europe. **Digital Services for Europe (DSE),** borne of the merger of DEC's Customer Services and Enterprise Integration Services units, will employ 14,000 workers handling 120 products, from professional services to the intelligent buildings program.

East meets West's prices

▶ **Microsoft Corp.** will reduce the prices on all software marketed in Eastern Europe to the level charged in the U.S. plus freight, according to a report in the Soviet business press. The firm's Soviet business manager, Dale Christensen, was quoted in the report as saying the price cuts, slated to start next month, will reduce the cost of Microsoft packages by as much as 35% to 40%.

Recession still dogs tech firms

Washington hails recovery, but hard-hit firms remain cautious

BY JIM NASH
CW STAFF

[redacted]

Company	Revenue April through June 1991	Percent change from 1990	Profit April through June 1991	Percent change from 1990
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Compression Labs, Inc.	$16.3M	27%	$.7M	27%
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Mentor Graphics Corp.	$94.6M	(8%)	($10.5M)	—
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Picturetel Corp.[1]	$17M	97%	$1.2M	—
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Tektronix, Inc.	$331M	(11%)	$14M	—

[redacted]

CW Chart: Doreen St. John

Officials in the Bush administration have said recently that the recession may have slogged to its nadir, but for those computer companies that have suffered the most, the pain is unlikely to end soon.

While pockets of enthusiasm and even prosperity exist, the industry remains cautious.

Most industry executives and regional public officials contacted earlier this month chuckled when told that the administration said an economic recovery was beginning. The computer industry, they said, is in for more of the same, at least for the rest of this year.

That is not bad news for personal computer networking firms and many software makers. A tally of vendors nationwide revealed expectations for continued strong performance in these sectors.

However, most others see at best a flat period in which no more competitive ground is lost.

Increased battles over smaller capital budgets could be a permanent part of high-tech sales, said Deborah Besemer, vice president of North American sales at Lotus Development Corp. in Cambridge, Mass. Besemer said she doubts the recession is over.

Large corporate accounts are showing "a new buying pattern," she noted. "They are looking much more closely at the return they get from software and hardware."

If a recovery has in fact begun, Besemer said, big companies have adopted closer scrutiny of purchases as a strategic policy instead of a head-for-the-cellar tactic.

Attachmate close to plan

Mike New, vice president of marketing at Attachmate Corp., said the Bellevue, Wash.-based maker of micro-to-host linking software has recorded revenue 25% to 30% higher than those logged in last year's corresponding period. "That's a little shy of what we expected," he acknowledged, but not by much.

New said the difference could be attributed to the recession or consumer indecision over which operating system to choose: Microsoft Corp.'s Windows or IBM's OS/2.

When it comes to networking, even a stiff recession has had only a subtle effect. The networking and internetworking markets are growing, according to Glen Smith, vice president and general manager of access products at Racal Data Communications. That contrasts with the fate of the leased-line and T1 communications markets, which he said have declined throughout the recession.

While Racal sees some positive signs in the economy, Smith said, "it is too soon to say the recession's over."

Spider Systems, Inc., maker of network analysis and monitoring equipment, reported continued growth and a more heated fight for customers' money.

"There's no doubt we are competing for a very tight dollar," said Jean Hammond, director of product marketing at Burlington, Mass.-based Spider. "But networks have continued to grow through it all." Hammond said Spider's customers do not seem to have greatly loosened up their purse strings.

The recession's impact on geographical regions is continuing to be just as disparate as its effect on various market niches. Sally Reed, county executive for Santa Clara County in the Silicon Valley, said the recession may have leveled off, but it is not over. Reed based her opinion "on a lack of negativity" among computer companies. "We see some inconsistent growth returning to the market."

Optimism is a likely harbinger of recovery, she noted, because it is the first step toward the planning and spending necessary to end recession.

No such luck for much of New England. A spokesman for the Massachusetts Executive Office of Economic Affairs in Boston said any recovery in that region is at least six months off.

Spider and FTP Software, Inc. in Wakefield, Mass., are two of the networking bright spots in the Route 128 area. Spider is "cautiously optimistic," Hammond said, and plans to free up its production budget slightly in anticipation of an upswing later this year. FTP "didn't see the recession," said Bruce Campbell, director of marketing.

"Maybe we would have grown a little faster if the recession had not hit," Campbell said. FTP concentrates on linking disparate computer systems with network software based on Transmission Control Protocol/Internet Protocol.

Beyond ISDN

FROM PAGE 69

Teleos last summer and went out of business at the end of the year.

"The ISDN 'market' was never really a market at all," acknowledged Roderick Randall, co-founder and director of strategic marketing at 4-year-old Teleos. "It was a means to filling customer needs. Many of us misfocused and missed opportunity" by trying to sell jargon and technology to users who did not understand how it could be applied.

Vendors are coming to grips with the fact that ISDN will not be the be-all, end-all wide-area technology but will instead coexist with and enhance other digital services.

The acknowledgements are as subtle as Teleos deleting the words "The ISDN Company" from its corporate letterhead.

The company, which today claims 100%-per-year growth, said that it survived largely because of its product range. Though Teleos initially expected to jump into end-user sales, its ISDN test and simulation equipment turned out to be a saving grace. The line allowed Teleos to sell to telephone companies, where the massive task of upgrading the country's telecommunications infrastructure had to be accomplished before end users could even get into the act.

Teleos has also reaped benefits from some joint projects with IBM. Teleos' IRX9000 switch, for example, works in conjunction with applications residing on an IBM Application System/400 midrange computer to beef up inbound and outbound telemarketing efficiencies.

Two heads better

Two-year-old Ascend is also partnership-savvy. All three major long-distance carriers now resell the company's 3-month-old digital access product, Multiband Controller. In addition, the vendor has teamed with T1 multiplexer vendor Network Equipment Technologies, Inc., router vendor Cisco Systems, Inc. and — as of last month — videoconferencing player Compression Labs, Inc. to integrate Multiband Controller into those companies' end-user equipment.

Ascend founder and product manager Jay Duncanson said demand for Multiband Controller, which allows ISDN and/or non-ISDN users to "connect to everyone," is currently exceeding supply. He noted that, like Vadis, Ascend timed the introduction of its first product, an ISDN-dependent device dubbed The Pipeline, "to coincide with what we thought would be universal ISDN availability" from telephone companies last year.

"It wasn't there," he said, "so now, we provide a universal range of access."

ISDN was the fair-haired telecommunications technology of the 1980s, and Duncanson said it has since become "something of a dirty word." The facts behind the fable, he said, are that ISDN has been poorly explained and mismarketed and has taken much longer to implement in a deregulated telecommunications industry than vendors and analysts initially predicted.

"This market is wide open," Duncanson said, noting that competition is emerging from such companies as T1 multiplexer vendors. "We now know that users only care about ISDN if it helps them solve a problem or save money. We must educate users that these benefits are available for the taking."

NATIONAL BRIEFS

Continued from page 69

Square dealer

▶ Organizations that "recognise that equality benefits everyone" are the nation's true change agents and "have made the kind of visible and lasting impact that deserves recognition," said Jane Kilburn, president of Women in Communications, Inc.

And with that, she handed her organization's 1991 Vanguard Award to IBM. Landmark achievements that paved the computer giant's way to the award, which honors business groups for their advancement of women to positions of equality, include the adoption of a company policy on equal employment as early as 1953 and the presence of women as 13% of the firm's senior management in 1990.

Say what?

▶ The fledgling speech-recognition market, which boasted an aggregate $107 million in 1990 sales, will increase to $576 million by 1995, according to a study released earlier this month by specialty research firm Voice Information Associates, Inc.

The report's authors claim that increasing end-user acceptance of personal computer-based programs and the maturing of voice-recognition technology are dovetailing. This could create some favorable marketing conditions for software that lets users bypass keyboards in favor of simply talking to a computer.

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- Bob Monastero
Manager of Human Resources,
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IS managers explain benefits of downsizing

BY EMILY LEINFUSS
SPECIAL TO CW

The phrase "corporate downsizing" can conjure up all sorts of negative images, especially for middle managers who historically have been most affected by organizational flattening. While downsizing is always painful because of layoffs and transitions, it can bring benefits as well, according to some information systems managers.

Because downsizing has become the rule rather than the exception at many organizations, it's a reality that few IS managers will avoid. According to a survey by management consultancy Cresap, a Towers Perrin Co., 75% of the 330 companies polled are currently experiencing organizational restructuring.

The main goal of downsizing is better efficiency and communications, says Alfred Caponiti, director of data and database administration at communications firm Bell Atlantic Corp. in Philadelphia. About 18 months ago, Bell Atlantic's IS division decided to change the five-level management hierarchy to four, eliminating one middle-level manager.

"Things can get done quicker in terms of approval processes going from top to bottom," Caponiti says. He likens the layers of hierarchical management to the children's game "operator," in which a whispered message is passed down the line. When the last person repeats the message aloud, it usually bears no resemblance to the original. Downsizing has improved this problem, he says.

Reducing middle management also broadens job responsibilities, IS managers say, because people at the lower level receive more authority and autonomy. At higher levels, employees step down from their ivory towers and take a more hands-on approach to their work.

"Over the past year, we have gone through an emphasis on empowerment — pushing decision-making down lower in the organization and creating broader spans of control for the upper management group," says Peter Daboul, senior vice president of IS services at Massachusetts Mutual Life Insurance Co. in Springfield, Mass.

Anish Mathai, vice president of technology strategic planning at Bankers Trust Corp. in New York, says the added responsibility forces lower level employees to learn to better deal with upper management. It also forces upper management to learn more about technology, Mathai adds.

Bankers Trust reduced its middle management in 1985 when it reorganized its technology to align with its business units.

Silver lining

While there are obviously some drawbacks to downsizing, companies are finding ways to overcome them. One of the biggest concerns about flat management structures is that there are fewer possibilities for promotion and upward mobility.

But companies are addressing this issue through innovative incentive programs. "Promotion used to be the carrot that got you to work harder," Caponiti says. Bell Atlantic, for example, has started implementing merit-oriented pay scales that give the best performers the biggest bonuses and merit increases, he says.

Another downside to corporate flattening is the danger of overwork. But managers say time management and priority-setting are effective tools that can help workers handle the added work load. If time-smart workers are still overloaded, managers are often willing to consider changing their responsibilities.

"If I see somebody is managing time well and doing a quality job, I will respect their opinion that the next piece is the one that will break the camel's back," Daboul says.

Leinfuss is a free-lance writer based in Sarasota, Fla.

Technicalities

One result of corporate flattening is that many companies are looking to technology to do some of the work that middle managers used to do.

Bankers Trust in New York is one such company. "Taking away the middle level of management doesn't take away the need for gathering information and reporting," says Anish Mathai, vice president of technology strategic planning at Bankers Trust.

"Middle managers spend a lot of time in unnecessary reporting," says Eric Hollenbeck, director or MIS at Lucas Aerospace, Inc. in Cleveland. "PC and database management programs have played a part in eliminating middle management because now you can gather information much faster."

However, Mathai adds that technology can go only so far in replacing people. The assessment and interpretation of the information gathered by computer has to be taken up by the remaining people at all levels.

EMILY LEINFUSS

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Hot search for telecom whizzes

Growing technology makes it hard to find qualified telecom employees

BY ALICE LAPLANTE
SPECIAL TO CW

Alamo Rent-A-Car, Inc. in Fort Lauderdale, Fla., has what Thomas Loane, vice president of computers and communications, calls the $4,300-second challenge.

"Every time I can figure out a way to knock a second off reservations time, I save the company $4,300 a month in WATS bills," Loane says. Telecommunications has become so important to Alamo that it now drives many information systems and corporate-level decisions, he says.

Indeed, telecommunications technology is moving so rapidly and encompasses such a broad spectrum of critical business issues that IS telecommunications managers say they're having a hard time finding qualified people.

As a result, skilled telecommunications workers are in demand at a time when many IS shops are downsizing and laying off personnel.

A bright area

"Telecommunications is one of the really bright career opportunities in IS today," says Jim Webber, president of Omicron, a technology consortium of 50 Fortune 500 firms, in Mountain Lakes, N.J. "It's at the heart of the best business contribution that IS can make to an organization, and corporations are realizing this at the highest levels."

Telecommunications workers at all levels of experience and expertise are being sought, according to Joyce Hunt, president of Hamilton Technical Personnel, a job placement firm in West Hurley, N.Y. She says that senior positions in large IS departments are particularly difficult to fill.

Pay day

"Companies are willing to pay more in salaries and search fees to find such people," Hunt says. Wages for senior telecommunications analysts can range from $50,000 to well over $100,000 — rivaling salaries paid to managers of large corporate data centers, Hunt says.

Skills particularly in demand include the following: local-area and wide-area networking design; knowledge of high-speed communications links such as T1 and T3; and mastery of the financial, administrative and technical complexities of managing a multivendor communications environment.

Demand for high-level telecommunications workers who have international experience has been boosted by the fact that many U.S. companies are currently expanding their domestic networks to handle international operations and setting up electronic data interchange trading partners around the globe.

Global flavor

"Because so many organizations are extending to Europe and the Far East, there is a need to know what technologies are available in those countries," says John Faccibene, vice president of telecommunications at Garban Ltd., a brokerage firm in New York.

Another major challenge is knowing how to negotiate contracts with foreign governments and vendors, Faccibene says, as well as understanding the national differences in terminology, technology and standards. "The globalization of telecommunications is something a lot of companies are just beginning to worry about," he says.

At Alamo, IS staff members in the UK are currently building an interface to British Telecommunications PLC's packet-switching network in order to provide on-line credit-card authorization to customers in the UK.

LaPlante is a free-lance writer based in Palo Alto, Calif.

A profession in transition

The telecommunications worker has come a long way in the last decade, graduating from a desk in an administrative or operations office to playing a key role in IS.

"Telecom used to mean putting a telephone that worked on an employee's desk," says Ivan L. Golb, president of Golb Information Systems Corp., an IS consulting firm based in Brooklyn, N.Y. "Now it involves everything from designing LANs and WANs all the way up to global networks utilizing satellite technology."

The main reason for the shift is rising costs, telecommunications managers say.

"Ten years ago, corporations realized that telecommunications made up often the second- or third-largest expense within the firm — usually higher than total MIS expense," says John Faccibene, vice president of telecommunications at Garban Ltd. in New York.

Add to this the fact that telecommunications can bring a strategic edge to business, and it made sense to elevate the status of the telecommunications department, Faccibene and others say.

But even though telecommunications is rapidly being integrated into the heart of many IS departments, there is a fundamental lack of cross-discipline training available, says Bill Micklin, manager of the bureau of telecommunications for the city and county of San Francisco.

"There are the traditional data processing classes that talk about SNA and TCP/IP and operating systems, but they don't extend toward such issues as analyzing transport requirements and fundamental telephony skills," Micklin says.

He adds that telecommunications classes are available on distribution requirements, cable and wire systems, long distance, 800 and virtual networks but says the link between those topics and traditional data processing remains weak.

ALICE LAPLANTE

TELECOMMUNICATION TECHNOLOGY DEVELOPMENT

WilTel has become a leader in the fiber-optic telecommunications industry by completing an aggressive network construction and acquisition program that in just five years has spanned the nation with 11,000 miles of fiber. WilTel is now fully focused on developing and marketing new technology and services. WilTel has formed an Advanced Technology and Development Group to implement a broadband network. Located in the Woodlands of South Texas, away from the day-to-day operations at WilTel's Tulsa-based headquarters, this group is using state-of-the-art tools and techniques to create breakthrough telecommunications technology.

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Team leaders and staff engineers with object-oriented design capabilities are needed for work on next generation network management and/or central office switching modules. Experience with real-time switching applications such as call processing/call handling, high-speed packetized data applications, and graphics user interfaces is highly desirable. Must have experience with object-oriented design using SMALLTALK, Objective C, or C++

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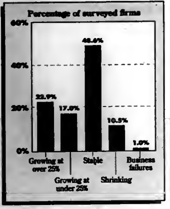

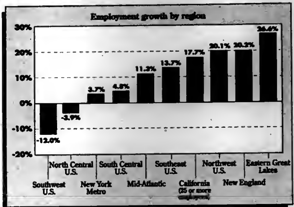

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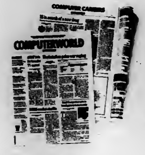

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   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 51. Sales & Mktg. Management

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Legal eye is a monthly column exploring legal issues and their impact on information systems.

BY KENNETH A. WASCH
SPECIAL TO CW

LEGAL EYE
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Information systems managers who think it's OK for end users to make occasional copies of software should think again. In the U.S., the software industry accounts for revenue of more than $4 billion a year. But that revenue is undermined by a $2 billion annual loss to piracy, an estimate the Software Publishers Association (SPA) says is conservative.

As personal computers and software become easier to use, it becomes easier to copy programs. Because it is so easy and because license agreements can be confusing, many people don't realize they are breaking the law.

However, the law governing the use of commercial software is straightforward: It is illegal to copy software without the copyright holder's permission for any reason but making a backup.

Consequently, IS managers should not only be aware of pirates in their midst but should also take action to stop them.

The most important step IS managers can take is to conduct an audit. While the idea may at first sound overwhelming, the procedure can be broken down into several simple steps:

- Collect and review all purchase records and license agreements. These will define exactly what an organization has purchased and will help clarify the licensing provisions of each program.
- Select a date for the audit and decide who will be involved. Evenings and weekends are least disruptive. The SPA suggests that the IS manager involve senior management, internal auditor, legal counsel, department heads, outside counsel and auditors.
- Decide whether employees will be notified in advance of the audit. If they are notified, send a note or memo explaining the procedure. If not, be certain to respect the property of your employees. The IS manager may find a noncompany program owned by an employee. In such cases, he should not erase any software without consulting the employee.
- Be sure to audit portable computers as well as stand-alone PCs. If your facility is large, mark PC locations on a floor plan. If software is not stored on hard disks, inventory all floppy disks.
- Compare the list of all software found with purchase records.
- Review all company policies on PC software. If the company has not established a policy, now is a good time to do so. Make sure that the policy about software on networks, laptops and employees' home computers is clear.
- Purchase additional software as needed. It may not be necessary to repurchase all software found during an audit.
- Conduct quarterly audits. While the initial audit may be time-consuming, subsequent ones will be much easier.

Keeping tabs

Besides perodic audits, IS managers should keep several other factors in mind. One of these is to "co-manage" hardware and software on an ongoing basis.

This means one person, an IS manager or auditor, should be responsible for hardware and software purchasing and distribution. When hardware is purchased, money must be budgeted for the accompanying software.

Another useful technique is to assign and label all PCs with an identification number. All software should be identified with the number of the PC on which it is installed. Place labels on manuals, original disks and license agreements. When hardware or software changes hands, it should go through the IS manager and be reassigned with new ID numbers.

Lastly, don't despair. Convincing management and end users that they must comply with software copyright law is a difficult but important task.

Wasch is executive director of the Software Publishers Association in Washington, D.C.

How not to be a pirate

The SPA has published a number of educational materials to help IS managers handle the problem of illegal software copying. Included in the *Self Audit Kit* are two brochures that explain the copyright law and how to comply with it. *Software Use and the Law* is a comprehensive guide to the law for software managers, and *Is It Okay to Copy My Colleague's Software?* discusses common questions regarding software use.

In addition, the SPA has released a videotape on software piracy, *It's Just Not Worth the Risk*. In this 12-minute dramatization of a staff meeting, a corporation's top managers discuss the risk software piracy could pose for their company and the positive steps they can take to address the problem. The video is a useful tool for educating corporate software users at all levels.

To obtain these materials, call the SPA at (202) 452-1600 or send a written request on company letterhead to SPA, Suite 700, 1730 M St. N.W., Washington, D.C. 20036. There is a $10 charge for the videotape.

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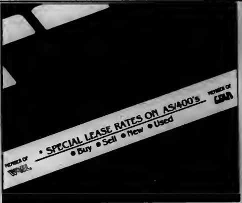

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PS/2 Model 30-286	$1,150	$1,300	$1,000
PS/2 Model 60	$1,300	$1,700	$1,300
PS/2 Model 70P	$3,400	$3,600	$3,200
Compaq Portable II	$700	$1,050	$700
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SLT 286	$1,700	$1,900	$1,650
Portable 386	$1,900	$2,100	$1,300
LTE 286	$1,900	$1,900	$1,600
Deskpro 286	$900	$1,000	$700
Deskpro 386/20	$2,150	$3,000	$2,000
Apple Macintosh Plus	$750	$975	$700
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INDUSTRY ALMANAC

Technology stocks have been "particularly hot" lately, as companies release financial reports. Watch out, though. Technology stocks are currently a mixed bag of good and bad deals. Some firms have pulled down favorable quarterly earnings, while others have reported less-than-expected results.

But what were technology shares doing before quarterly financials assaulted Wall Street? The following is a rundown of selected stocks that have gained and lost the most points during the past two months:

Gainers

Selected technology stocks that have recently jumped 20% or more:

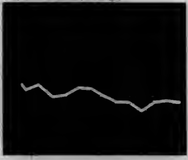
Company	Mid May stock closing price	Mid-July stock closing price	Dollar gain	Percent gain
[illegible]	$6	$7.75	[illegible]	[illegible]
[illegible]	$12.13	$15.5	[illegible]	[illegible]
[illegible]	$21.75	$27.5	[illegible]	[illegible]
[illegible]	$29	$36.25	[illegible]	[illegible]
[illegible]	$8.63	$10.75	[illegible]	[illegible]
[illegible] Corp.	$22	$27	[illegible]	[illegible]
[illegible] Corp.	$11.25	$14	[illegible]	[illegible]
Cambex Corp.	$11.75	$14.5	[illegible]	[illegible]
[illegible] Micro, Inc.	$2.5	$3	[illegible]	[illegible]

Losers

A sampling of stocks that have recently slipped 20% or more:

Company	Mid May stock closing price	Mid-July stock closing price	Dollar drop	Percent drop
Floating Point Systems, Inc.	$2.50	$1.13	[illegible]	[illegible]
Micropolis Corp.	$13.25	$6.50	[illegible]	[illegible]
Go-Video, Inc.	$1.88	$1	[illegible]	[illegible]
Maxtor Corp.	$4.13	$2.38	[illegible]	[illegible]
[illegible] Corp.	$99.25	$67	[illegible]	[illegible]
[illegible] Computer Systems, Inc.	$13.25	$9.50	[illegible]	[illegible]
Western Digital Corp.	$5	$3.63	[illegible]	[illegible]
[illegible], Inc.	$0.94	$0.69	[illegible]	[illegible]
[illegible], Inc.	$32.50	$24.25	[illegible]	[illegible]
[illegible]	$8.69	$6.63	[illegible]	[illegible]
[illegible]	$11.88	$9.13	[illegible]	[illegible]
[illegible]	$9	$7	[illegible]	[illegible]
[illegible]	$18.00	$14.5	[illegible]	[illegible]
[illegible]	$23.88	$18.25	[illegible]	[illegible]

STOCK TRADING INDEX



THIS WEEK'S HIGHLIGHTS

- Minicomputer makers Digital Equipment Corp. and Data General Corp. released quarterly financials last week. DEC reported a huge loss for its fourth quarter, but its stock jumped 2⅝ points to close Thursday at 69⅝. DG said quarterly profits and sales were on track, but shares fell 1⅛ points last week to 16⅝.
- Silicon Graphics, Inc. slipped ¾ of a point to 31⅞. The firm introduced new low-end workstations last week. Sun Microsystems, Inc. also unveiled new machines; its stock dipped as well, losing ⅝ of a notch to 27⅝.
- Tandy Corp., which shuffled senior executives around in both its Grid Systems Corp. and Farallon Computing, Inc. units, dove 1¾ points last week to 27⅛.
- Among software firms, Borland International, Inc. slipped 2⅞ points to 46⅜. AI Corp. took a hit after negative earnings news, sinking 2⅜ points to 4⅛. Aldus Corp. plunged 3½ points to 39½, despite reporting positive financial news. Microsoft Corp. lost 1 point to close at 66.

Computerworld Friday Stock Ticker

CLOSING PRICES FRIDAY, JULY 26, 1991

TOP PERCENT GAINERS

Alliant Computer Sys.	16.67
Maxtor Corp.	15.00
Tandon Corp.	14.58
Banctec Inc.	10.64
Recognition Equipment	10.00

TOP PERCENT LOSERS

AI Corp.	-36.54
Pansophic Systems	-22.75
Convex Computer	-22.58
MAI Systems Corp.	-22.20
Hogan Systems Inc.	-21.57

TOP DOLLAR GAINERS

Microsoft Corp.	[illegible]
Cray Research Inc.	3.50
Symantec Corp.	2.50
Bellsouth Corp.	[illegible]
Pacific Telesis Group	2.25

TOP DOLLAR LOSERS

Borland Int'l	-3.88
Aldus Corp.	-3.50
Convex Computer	-3.50
Compression Labs Inc.	-3.38
IPL Systems Inc.	-3.25

Communications and Network Services [illegible]

Exch	52-Week Range			July 26 Close	Wk Net Change	Wk Pct Change
OTC	10.88	3.88	3COM Corp.	7.13	-0.38	-5.00
NYS	68.75	52.50	American Info Techs Corp.	60.50	0.88	1.47
NYS	40.00	29.00	AT&T	38.88	0.38	0.98
OTC	4.50	0.88	Artel Communication Corp.	1.50	0.06	4.20
NYS	[illegible]	[illegible]	Bell Atlantic Corp.	48.50	0.25	0.52
NYS	[illegible]	[illegible]	Bellsouth Corp.	48.50	2.38	5.14
NYS	48.50	13.10	Cabletron Systems	42.50	-0.38	-0.88
OTC	35.50	8.25	Compression Labs Inc.	14.50	-3.38	-18.57
OTC	6.13	2.44	Data Switch Corp.	[illegible]	0.18	4.88
NYS	22.75	8.38	Digital Comm. Assoc.	13.88	-0.50	-3.48
OTC	26.25	12.25	Dynatech Corp.	18.50	-0.38	-1.98
OTC	12.38	6.88	Fibronics Int'l Inc.	6.25	-0.50	-0.75
OTC	6.75	1.75	Gandalf Technologies Inc.	2.50	-0.13	-4.88
NYS	[illegible]	1.88	General Datacomm Inds.	2.63	-0.13	-4.55
NYS	33.50	23.50	GTE Corp.	29.38	0.00	0.00
NYS	63.00	40.88	ITT Corp.	57.00	-1.75	-2.98
OTC	37.63	17.88	MCI Communications Corp.	27.50	-0.50	-1.75
OTC	8.88	2.75	Microcom Inc.	7.38	-0.13	-1.67
NYS	10.88	4.00	Network Equipment Tech.	10.25	0.88	8.83
OTC	10.88	4.00	Network General	8.50	-0.25	-3.88
OTC	10.88	8.13	Network Systems Corp.	14.88	0.88	6.88
NYS	36.38	22.10	Northern Telecom Ltd.	38.88	1.10	2.94
OTC	69.50	17.25	Novell Inc.	56.00	0.25	0.48
NYS	77.50	67.00	Nynex Corp.	75.25	0.38	0.51
NYS	47.50	38.25	Pacific Telesis Group	42.88	2.25	5.54
OTC	11.63	5.88	Penril Data Comm. Ntwks.	8.00	-0.88	-9.88
NYS	25.88	8.88	Scientific Atlanta Inc.	14.50	-0.25	-1.98
NYS	57.50	47.25	Southwestern Bell Corp.	53.00	-1.10	-2.08
NYS	31.50	20.88	United Telecom	26.75	-0.75	-2.75
NYS	40.75	32.38	US West Inc.	38.88	0.63	1.80

Computer Systems [illegible]

Exch	52-Week Range			July 26 Close	Wk Net Change	Wk Pct Change
OTC	8.88	0.88	Alliant Computer Sys.	0.88	0.13	16.67
ASE	17.88	10.00	Amdahl Corp.	13.88	-1.00	-6.75
OTC	73.25	34.25	Apple Computer Inc.	44.88	-1.13	-2.46
OTC	10.25	3.50	Archive Corp.	8.88	-0.38	-4.88
OTC	28.75	7.50	AST Research Inc.	25.25	1.00	4.12
NYS	8.38	4.00	Bolt, Beranek & Newman	7.13	-0.25	-3.39
NYS	21.63	4.50	Commodore Int'l	13.88	0.10	0.88
NYS	74.25	28.88	Compaq Computer Corp.	31.88	-1.13	-3.41
OTC	2.13	0.13	Computer Automation Inc.	1.25	0.06	5.22
NYS	16.25	8.75	Control Data Corp.	10.00	-0.10	-1.98
NYS	18.75	8.88	Convex Computer	12.00	-3.50	-22.58
NYS	46.25	30.00	Cray Research Inc.	38.00	3.50	7.46
NYS	18.63	3.50	Data General Corp.	17.88	-0.75	-4.14
NYS	3.25	0.75	Datapoint Corp.	1.88	-0.10	-6.88
OTC	30.63	8.25	Dell Computer Corp.	30.00	0.00	0.00
NYS	93.00	48.50	Digital Equipment Corp.	69.63	1.10	1.67
NYS	21.88	13.75	Harris Corp.	20.10	-0.38	-1.42
NYS	38.88	24.88	Hewlett Packard Co.	53.88	-0.13	-3.75
NYS	139.75	[illegible]	IBM	100.50	0.30	0.00
OTC	10.00	7.75	Information Int'l	10.00	0.75	8.11
OTC	31.50	10.50	Intergraph	21.50	-0.75	-3.37
NYS	2.25	0.44	MAI Systems Corp.	0.44	-0.12	-22.20
NYS	148.00	114.00	Matsushita Electronics	123.25	-0.50	-0.40
OTC	10.00	8.00	Mentor Graphics Corp.	13.38	-0.88	-6.14
NYS	108.38	44.80	NCR Corp.	108.25	-0.10	-0.11
OTC	29.50	10.75	Pyramid Technology	16.25	-1.00	-5.80
OTC	27.75	8.25	Sequent Computer Sys.	8.50	0.50	5.56
NYS	47.88	16.00	Silicon Graphics	34.25	0.88	2.82
NYS	37.25	14.88	Stratus Computer Inc.	33.75	-1.63	-4.58
OTC	38.63	15.00	Sun Microsystems Inc.	28.63	-0.63	-2.14
NYS	19.88	8.88	Tandem Computers Inc.	12.25	-0.88	-6.89
NYS	37.50	23.50	Tandy Corp.	27.10	-1.88	-6.24
OTC	26.25	8.75	Teradata	14.50	-0.25	-1.58
NYS	7.00	1.98	Ultimate Corp.	8.38	-0.98	-10.00
NYS	11.88	1.75	Unisys Corp.	4.00	0.25	6.67
ASE	6.75	[illegible]	Wang Labs Inc. (b)	3.38	0.38	[illegible]

Software & DP Services [illegible]

Exch	52-Week Range			July 26 Close	Wk Net Change	Wk Pct Change
OTC	68.00	17.00	Adobe Systems Inc.	40.88	-0.75	-1.80
OTC	12.25	3.50	AI Corp.	4.10	-2.38	-36.54
OTC	39.88	20.25	Aldus Corp.	39.50	-3.50	-8.14
OTC	38.88	12.00	American Mgmt. Systems	20.50	-1.50	-6.82
OTC	17.63	7.50	American Software Inc.	10.88	-0.88	-4.81
NYS	4.63	1.50	Anacomp Inc.	4.88	-0.10	-3.88
OTC	20.00	10.00	Analysts Int'l	13.00	0.00	0.00
OTC	10.50	4.88	Ashton Tate	13.63	-0.75	-4.88
OTC	10.38	4.00	ASK Computer Sys.	10.00	0.88	[illegible]
NYS	37.88	30.88	Auto Data Processing	50.88	-0.88	-1.88
OTC	62.25	30.00	Autodesk Inc.	[illegible]	-0.38	-0.67
OTC	30.88	10.88	BGS Systems Inc.	[illegible]	0.88	0.79
OTC	48.25	17.75	BMC Software Inc.	44.00	-0.25	-0.56
OTC	16.25	6.75	Boole & Babbage Inc.	8.88	-1.13	-10.84
OTC	64.25	14.50	Borland Int'l	46.50	-3.88	-7.88
NYS	7.50	0.44	Businessland Inc.	0.75	0.00	0.00
OTC	30.88	8.10	Cognos Inc.	17.00	0.88	5.48
NYS	11.13	4.88	Computer Associates	8.88	-1.25	-12.38
OTC	17.75	8.88	Computer Horizons	48.50	0.00	0.00
NYS	73.25	36.75	Computer Sciences	63.13	-0.13	-0.20
NYS	11.88	8.38	Computer Task Group	7.25	-0.38	-4.90
OTC	29.75	13.00	Comshare Inc.	30.25	0.75	2.55
OTC	18.50	3.75	Corporate Software	8.88	-0.38	-4.05
NYS	40.88	27.88	General Motors E (EDS)	48.50	-0.25	-0.51
OTC	16.75	7.88	Goal Systems Int'l	14.25	0.25	1.75
OTC	7.00	1.88	Hogan Systems Inc.	5.00	-1.38	-21.57
OTC	34.88	7.75	Information Resources	32.50	-1.00	-3.08
OTC	10.63	6.88	Informix Corp.	5.75	0.00	0.00
OTC	8.88	1.88	Intellicorp Inc.	3.13	-0.13	-3.88
OTC	8.88	0.88	Interleaf Inc.	8.88	-0.38	-0.75
OTC	15.88	5.88	Intersolv	8.88	-0.75	-7.32
OTC	43.25	40.50	Knowledgeware Inc.	38.00	-0.75	-0.38
OTC	46.00	16.75	Legent Corp.	34.00	-0.50	-0.86
OTC	38.88	18.88	Lotus Development	35.25	0.25	0.71
OTC	32.00	10.50	Manugistics	11.75	-1.00	-7.88
OTC	78.38	33.88	Microsoft Corp.	71.00	3.25	4.80
NYS	16.50	4.50	On Line Software Int'l	8.88	-0.10	-1.88
OTC	17.38	4.88	Oracle Systems	8.25	0.50	7.69
NYS	13.88	7.50	Pansophic Systems	8.88	-3.00	-22.75
OTC	10.00	1.88	Phoenix Technologies	8.88	-0.38	-4.05
NYS	52.00	33.38	Policy Management Sys.	40.00	-0.50	-1.01
NYS	32.75	11.00	Reynolds & Reynolds	21.88	-1.00	-4.55
OTC	27.88	14.75	SEI Corp.	24.00	-1.75	-6.67
OTC	22.88	12.75	Shared Medical Systems	22.00	-0.10	-0.38
OTC	28.25	10.00	Software Publishing Corp.	15.00	0.63	4.35
NYS	14.63	5.88	Sterling Software	12.88	-0.88	-0.98
OTC	22.50	8.00	Sungard Data Sys.	17.00	0.88	5.38
OTC	88.88	17.75	Symantec Corp.	48.50	2.50	5.43
NYS	18.88	4.00	System Center Inc.	8.88	-0.10	-1.88
OTC	37.25	13.50	System Software Assoc.	14.38	-1.88	-40.90
OTC	16.75	4.75	Walker	6.38	-1.13	-15.33

Semiconductors [illegible]

Exch	52-Week Range			July 26 Close	Wk Net Change	Wk Pct Change
NYS	14.88	8.60	Advanced Micro Devices	10.38	-0.75	-6.74
NYS	12.80	6.50	Analog Devices Inc.	8.00	-0.88	-6.88
OTC	17.00	9.50	Chips & Technologies	7.38	-0.25	-3.28
OTC	59.63	28.00	Intel Corp.	45.25	-2.00	-4.23
NYS	18.50	6.10	LSI Logic Corp.	7.10	-1.38	-14.93
NYS	19.13	6.75	Micron Technology	11.88	-0.50	-4.04
OTC	20.50	7.50	MIPS Computer Systems	10.88	-0.38	-3.17
NYS	69.63	46.75	Motorola Inc.	58.88	-1.50	-2.31
NYS	8.88	3.00	National Semiconductor	5.75	-0.10	[illegible]
NYS	47.88	29.80	Texas Instruments	33.10	-0.38	-1.10
OTC	12.25	6.88	VLSI Technology	7.63	-0.88	-10.38
ASE	12.38	5.50	Western Digital Corp.	3.75	0.38	[illegible]

Peripherals & Subsystems Up [illegible]

Exch	52-Week Range			July 26 Close	Wk Net Change	Wk Pct Change
OTC	2.75	0.38	Aperture Technologies	1.88	0.00	0.00
OTC	20.50	7.50	Banctec Inc.	13.00	1.25	10.64
OTC	17.88	4.25	Cambex Corp.	14.88	-0.38	-3.38
ASE	11.75	4.13	Cognitronics Corp.	8.75	-0.13	-1.41
NYS	31.88	14.63	Conner Peripherals	20.63	-0.38	-1.75
ASE	18.88	7.50	Dataram Corp.	10.25	0.00	0.00
NYS	13.00	4.25	EMC Corp.	6.25	0.25	4.17
NYS	47.88	35.75	Eastman Kodak Co.	39.50	-1.10	-0.77
OTC	11.25	4.75	Emulex Corp.	8.88	0.00	0.00
OTC	27.75	14.00	Evans & Sutherland	19.38	0.25	1.31
OTC	8.50	3.88	Iomega Corp.	4.38	[illegible]	1.88
OTC	28.25	8.75	IPL Systems Inc.	19.25	-3.25	-14.44
OTC	1.88	0.13	Masstor Systems	0.81	-0.12	-13.33
OTC	11.63	1.63	Maxtor Corp.	8.88	0.88	15.00
OTC	18.00	4.88	Micropolis Corp.	7.13	0.50	7.58
NYS	97.50	73.63	3M Corp.	87.88	-0.25	-0.29
OTC	11.88	6.00	Printronix Inc.	7.00	-0.25	-3.23
NYS	34.75	8.50	QMS Inc.	20.88	0.63	3.16
OTC	18.25	8.25	Quantum Corp.	13.63	-0.63	-4.39
NYS	7.50	4.88	Recognition Equipment	6.88	0.63	10.00
OTC	11.50	4.00	Rexon Inc.	7.88	0.13	1.61
OTC	19.88	6.63	Seagate Technology	8.50	0.10	1.33
NYS	47.50	11.50	Storage Technology	43.50	-2.00	-4.40
OTC	4.75	1.25	Tandon Corp.	2.94	0.38	14.63
NYS	30.50	11.63	Tektronix Inc.	26.75	-0.75	-2.46
OTC	0.53	0.16	Televideo Systems	0.38	[illegible]	0.00
NYS	[illegible]	[illegible]	Xerox Corp.	57.00	-0.25	-0.44

Leasing Companies [illegible]

Exch	52-Week Range			July 26 Close	Wk Net Change	Wk Pct Change
OTC	18.25	7.00	Amplicon Inc.	14.75	-0.13	-0.84
NYS	28.50	14.63	Comdisco Inc.	21.13	-1.75	-7.88
OTC	14.63	8.88	LDI Corporation	11.75	-0.50	-4.08
OTC	4.63	2.25	Selecterm Inc.	3.38	-0.25	-6.67

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Legacy

FROM PAGE 1

But on balance and given the imperfection of war, analysts praised the information systems used to manage battles, aim weapons and handle logistics. "The effect of high technology — in weapons, command and control systems, intelligence and other areas — has revolutionized the nature of war," said a postwar report issued last week by the Center for Strategic and International Studies (CSIS), a Washington, D.C.-based think tank.

Military analysts at the Pentagon, CSIS and several universities offered the following "lessons learned" from the use of technology in the Persian Gulf war:

- The U.S. will need to hold its technology edge in the future and reduce its dependency on foreign electronics. During the war, "U.S. officials were reminded, to their discomfort, that many badly needed microchips and other electronic equipment . . . are now made only in Japan," the CSIS report said. "If Japan decides to sit out the next war, this could become a real problem."
- Desert Storm relied heavily on military and commercial satellites for communications, but they "were vulnerable to jamming had the enemy chosen to do so," the Pentagon report said.
- The value of having software-controlled weapons systems was demonstrated by the Patriot defense system, which had several software upgrades during the course of the war to fine-tune its ability to hit incoming Scud missiles. However, complex systems like the Patriot are also susceptible to software bugs, such as the faulty algorithm that allowed a Scud to hit a U.S. Army barracks in Dhahran, Saudi Arabia [CW, May 27].
- Battlefield communications systems were taken up by command-and-control operations, so the transfer of logistics data often had to be accomplished "by courier using a floppy disk or magnetic tape," the Pentagon report said.
- Commanding Gen. H. Norman Schwarzkopf complained to Congress about the incompatibility of various computer intelligence systems. The often competing intelligence agencies are working to make their systems more compatible, sources said, but they are far from producing an ideal system that fuses data, satellite imagery and human intelligence reports into an integrated, real-time resource for battle commanders.
- The one-two punch of electronic suppression of Iraq's air defenses and smart bombs proved devastating to Iraqi forces. Battle management systems that coordinate these attacks, such as the computer-packed airborne warning and control planes and the computers cranking out the Air Tasking Orders, will be a vital part of all future wars.
- The high-technology weapons performed better than expected, with reliability rates higher than in peacetime, although that may have been the result of an extensive maintenance operation and the liberal use of spare parts in the field, the CSIS analysts said. Attention to the fragility of high-tech systems should continue, they added.

"Basically, high technology was vindicated in Desert Storm," U.S. Rep. Les Aspin (D-Wis.), chairman of the House Armed Services Committee, declared in a recent speech. There was a school of thought prevalent in the 1980s that high-tech equipment would be too unreliable in the grit, grime and hard knocks of warfare, but "Desert Storm proved the worst fears of this school to be unfounded," according to Aspin.

> "THE EFFECT of high technology — in weapons, command and control systems, intelligence and other areas — has revolutionized the nature of war."
>
> CENTER FOR STRATEGIC AND INTERNATIONAL STUDIES

In fact, the stunning video footage of smart bombs zooming through the doors of Iraqi command centers has changed public perceptions about technology and war itself, at least temporarily.

"We were given confidence in our technology by what happened in the war," said Brian Stonehill, a media analyst at Pomona College in Claremont, Calif. "For the first time, we found that this technology does exactly what it was designed to do, at a time when American technology was in a public-opinion slump."

Richard E. Thomas, director of the Center for Strategic Technology at Texas A&M University, said he was concerned that a postwar love affair with military technology may make "John Q. Public more willing for the U.S. to get involved [militarily] and be the cop of the world, if it's going to be quick, precise and low in casualties."

Thomas and other military analysts warned the techno-euphoria should be tempered with the realization that the war with Iraq had an unusual set of circumstances that allowed the technology to shine, and those circumstances are not likely to be repeated.

"We'll get into grave danger if we assume that all wars can be won this quickly and easily by employing high-tech weapons," said Steve Guerrier, professor of national security policy at James Madison University in Harrisonburg, Va.

Besides having nearly six months to prepare for war, the U.S.-led coalition was fortunate to be fighting on a barren landscape where satellites and air surveillance could easily spot enemy targets and smart weapons could engage those targets. That would not be the case in a war fought in forests, jungles or cities, analysts observed.

The F-117 fighter, with its "smart" weapons, was a stellar performer in the Persian Gulf but did not fare well in Panama's jungles, Aspin noted in his speech. "High tech certainly proved itself against its harshest critics, but we should understand it may not work as well in all circumstances," he concluded.

The CSIS report insisted that despite the importance of technology to the allied victory, the war was really won by people: wily commanders and well-trained soldiers. Human resourcefulness also played a role in keeping the battlefield computers running, as illustrated by reports that soldiers swathed their computer keyboards in plastic wrap to protect them from the blowing desert sand.

Sometimes, the computer systems had to be installed under full combat conditions. For example, Air Force technicians installed one Unisys Corp. DCP/15 communications processor under direct artillery fire in 30 minutes — a considerable and necessary improvement over the 2½ days usually required, according to the Air Force Standard Systems Center based in Montgomery, Ala.

Another installation challenge was that electrical cables could not be buried underground because that would have implied a permanent allied military presence, which the Saudi government opposed.

So cables had to be strung above-ground through the drilled-out handles of shovels stuck in the sand.

However, that created another problem: Wildcats liked to chew on the cable insulation.

Hot fax

The U.S. Air Force took a lot of flak in the press last year about its purchase of digital fax machines that could operate in extreme weather conditions — and that cost about $190,000 apiece.

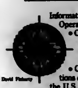
But Gen. Ronald W. Yates, commander of the Air Force Systems Command, said the "tactical digital facsimile machines" played an important role in the war. "During the first days our fighters deployed to the Gulf, this fax was the only secure way of immediately updating their target folders, short of physically flying in the material from the U.S.," Yates said in a recent speech.

He said the high-resolution images included "terrain, routes, heading and threats . . . the kinds of things pilots have to know to survive."

Critics had questioned the need for a fax machine that can operate in temperatures up to 125 degrees and in blowing sand, yet those were the conditions in the tents in Saudi Arabia. The ruggedized fax machines stood up to heat that was literally melting commercial fax machines, Yates said.

MITCH BETTS

Computers go to war


David Flaherty

Information technology played several roles in Operation Desert Storm:

- Computers coordinated air strikes involving thousands of sorties a day, handled air-traffic-control duties and guided cruise missiles and smart bombs.
- Computers also ran the business functions of the allied war machine. For example, the U.S. Army relied on a network of portable CTOS-based workstations from Unisys to track everything from personnel and maintenance records to inventories of ammunition and toilet paper.
- Desert Storm saw the first large-scale deployment of local-area networks in a war zone, as well as the most extensive data communications network ever used in a military conflict.
- At least 20,000 microcomputers — a hodgepodge of commercial and ruggedized desktop, luggable and laptop units — were used in Desert Storm, according to an estimate by *Federal Computer Week*.
- The best way to get mail from home to the soldiers was via electronic mail networks or fax.

MITCH BETTS

Reserve IS unit still at work

Stateside reservists continue to process orders for troops in Saudi Arabia

BY KIM S. NASH
CW STAFF

The fat lady has yet to sing for the 324th Data Processing U.S. Army Reserve unit. After sweating out 9½ months in Saudi Arabia — longer than any other reserve unit deployed to the Persian Gulf war — the 52 Bedford, Mass.-based reservists are continuing their wartime mission back on home soil.

With the U.S. and Iraq still engaged in a tense face-off over the Middle East nation's nuclear weapons capability, the 324th will continue to coordinate and fill supply requests between a U.S.-based Material Management Unit and units that are still in the war zone.

"We're just waiting for a phone hookup from MCI from the U.S. to Saudi Arabia. Then we'll be ready to go," said Sgt. Wendell Beppler, who oversaw the unit's computer operations during the fighting.

The 324th — one of only 12 similarly equipped data processing units in the world — returned to Hanscom Air Force

Base in three waves on June 17,18 and 19.

The mobile computer team processed requisitions for 386 Army front-line and support units in the Gulf war.

"A paper clip, a dump truck — didn't matter. We got it for them," Beppler said.

The seven active-duty and 45 "weekend warriors" of the 324th lived and worked in Dammam, a city just north of Dhahran, about 200 miles from the front.

Although stationed in the rear theater, the unit had to be prepared for the possibility of terrorist attack, such as drive-by shootings and random grenade tossings common in Middle East fighting.

Maintaining order

An important battle plan for both the allies and the Iraqis was to disrupt the other side's supply lines to the front by causing havoc in the rear, according to 1st Lt. Deborah Wilson, commander of the 324th. "Nothing like that happened in our area, though. Our unit did an excellent job," she said.

Just nine miles from the 324th's compound, however, an Iraqi Scud missile killed or injured several reservists in February.

"We didn't know if there would be more Scuds headed our way. That was hairy," said Staff Sgt. Bill Waters, who maintained the one backup and two primary generators needed to run the unit's IBM 4341 computer and other equipment.

Before that Scud hit the center of the other unit's warehouse, nearby soldiers were comfortable with the apparent invincibility of the U.S. military's Patriot missile. Then it failed.

> THE NOW U.S.-based 324th DP unit will continue to fill supply requests for the 22,900 U.S. troops remaining in Saudi Arabia.

"It was scary realizing that the Patriot wasn't 100% successful," Wilson said. She assumed command of the 324th in April, when then-leader Maj. John Welch was sent home after his mother-in-law died.

While the unit carried out its duties of tracking and routing supplies for the 540,000 U.S. troops fighting the Persian Gulf war, members of the 324th said they had a tough time coping with putting their personal lives on hold.

Sgt. Barbara Washington

Before they *left for the Gulf, soldiers in the 324th unit, such as Sgt. Barbara Washington, were trained to shoot M-16 rifles*

"Everyone missed some personal event by being over there, even besides Christmas and all the other holidays" including stateside birthdays, anniversaries, births and deaths, Wilson said. "I was supposed to be married on June 8, but we didn't get home in time," she explained. "But there's a lot worse that could have happened."

When the team landed in Saudi Arabia on Oct. 6, 1990, team members immediately drove their four trailers of equipment off three huge C-5A Galaxy cargo planes and set up shop.

Fighting the heat

Cooling the computers in the 120-degree temperatures of the Saudi desert was first priority. Even without a permanent site assigned, the team got the system up and running within three hours of hitting the airstrip — a unit record.

"We have real technology experts in our unit. We're the best," declared Sgt. Steve Wilkes, one of the unit's programmers, echoing sentiments expressed by his colleagues.

Not once in 9½ months of active service did the system go down, according to Beppler. "And we're ready to go again," he added.

They may have to. Last Thursday was the United Nations-ordered deadline for Iraq to disclose full details of its nuclear arms capabilities — a confession that Iraq has thus far been reluctant to make.

That refusal and the continuing conflict between Iraqis and Kurdish refugees has stirred talk in some circles that U.S. troops will be redeployed to the Gulf. But the 324th personnel said they are not worried.

"If that's what we have to do, we'll do it," said Sgt. Kevin Eaves, a systems programmer.

CW Chart: Janell Genovese

NEWS SHORTS

Central Point to kill PC Tools bugs

A variety of bugs in Central Point Software, Inc.'s PC Tools Version 7, including some that could cause data loss, will be fixed on a maintenance release that will be distributed free of charge to registered users. Phone lines and the Central Point forum on Compuserve have reportedly been flooded with calls from users finding problems with the personal computer utility package. "It takes years to earn [customers'] respect, and it takes a matter of seconds to lose their respect. I think that we just really need to stay focused on that premise," company President Corey Smith said.

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European computer airlift begins

Today, the Boston-based East/West Education Development Foundation is expected to kick off efforts to airlift computer equipment to several sites for use by journalism schools and student newspapers in Moscow, Prague and Bratislava, Czechoslovakia. The move builds on a continuous effort to promote democracy and freedom of speech by recycling computer equipment no longer used in the U.S. The airlift of laptop machines, donated by NEC Technologies Corp., will begin today from Boston's Logan Airport.

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General Datacomm cuts back

T1 multiplexer maker General Datacomm Industries, Inc. pointed to a continued weak world economy as the culprit behind its recently stated intent to reduce spending levels by $10 million over the next year. The spending cutback reportedly includes a planned worldwide work-force reduction of about 10% at varying percentages in all areas of the organization. Charles P. Johnson, chairman and chief executive officer of the $200 million firm, said, "The rise in revenues we had anticipated in fiscal 1991 has not yet materialized . . . We cannot be certain when an upturn in these economies will translate into an increase in sales."

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Businessland spurns buyout offer

Businessland, Inc. said it rejected a nonbinding proposal of acquisition from Computerland Corp. last week. The proposal, which offers Computerland common stock in exchange for Businessland stock at a value of $1 per share, was deemed less favorable than the offer currently on the table from JWP, Inc., noted the board of directors at the beleaguered company.

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Oracle, NCR strike OLTP deal

Oracle Corp. and NCR Corp. announced last week that they will integrate NCR's Unix-based distributed transaction management software with Oracle's relational database management system. With the products working together, the Oracle RDBMS would act as the manager to control database information, while NCR's Top End would provide the communications and transaction control. Both products currently run on the NCR System 3000 series.

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Report sees net growth in Europe

The European market for network services will more than double by 1995, according to a recent Frost & Sullivan, Inc. report. The market, currently worth $4.7 billion, will reach $10.2 billion by that time, with the number of private networks and Integrated Services Digital Network terminal adapters growing most sharply. The largest market, the report said, will be local-area networks, which is forecast to be worth $2.48 billion by 1995 — 40% of total value shipments.

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Chattanooga homes test fiber

Fiber transport provider Broadband Technologies, Inc., based in Research Triangle Park, N.C., said last week it is participating in a Bellsouth fiber-to-the-home trial in Chattanooga, Tenn., for telephony and video services. Broadband's FLX 100 will link an initial 30 residences directly to Bellsouth's public telephone network and will eventually expand to 400 homes, covering about 470 acres in Eastern Tennessee.

DEC's purchase of Philips wins praise

Unix products to complement DEC lines nicely

BY MARYFRAN JOHNSON
CW STAFF

GENEVA — The pending sale of Philips Electronics N.V.'s faltering computer division to Digital Equipment Corp., announced here last week, presents DEC with the dual opportunity of adding new customers and gaining Unix market share, European industry analysts agreed.

"This is a good deal for DEC. They're buying up a relatively small vendor with less than 5% of the European market, but it's still a lot of customers," said Lars Mieritz, a senior technical analyst at the London office of Technology Investment Strategies Corp. "Philips has a whole range of Unix products that fit into niches where DEC has no products today, particularly in the banking segment."

Market share by shipment value

Systems costing between $100,000 and $1 million

1989	
IBM	21%
DEC	15%
Hewlett-Packard Co.	7%
Unisys Corp.	6%
Siemens Nixdorf Informationssysteme AG	6%
Other	45%
(Philips was under 1%)	

1990	
IBM	22%
DEC	11%
HP	10%
Bull HN Information Systems, Inc.	7%
Siemens Nixdorf	6%
Philips	3%
Other	41%

Source: International Data Corp., UK

DEC officials downplayed the danger of taking over a money-losing computer business, saying a corporate "belt-tightening" at Philips during the past year had brought its information systems division to a break-even point.

Although the "agreement in principle" on the sale will not be concluded until October, DEC officials said the lure of Philips' $1 billion annual business in small to medium-size firms and retail banks is worth the wait.

Philips President Jan Timmer said the sale of the computer division's financial applications, software tools, image and document management systems and all related customer service activities would allow Philips to focus on its commodity business of selling personal computers.

Headquartered in Eindhoven, Netherlands, the 101-year-old Philips is a $30 billion conglomerate that ranks among the world's largest electronics and consumer goods firms.

Philips' computer division had clearly been the company's weakest link, European analysts said. Once a leader in word processing systems throughout the continent — in much the same way Wang Laboratories, Inc. held sway in U.S. offices in the 1970s and early '80s — Philips fell prey to the same mistakes as DEC by sticking too long with proprietary technology and ignoring the advent of PCs, they said.

"Computing has never been Philips' mainline business, and they haven't made a blooming success of it," DEC spokesman Dallas Kirk acknowledged. "But it's our only business, and it will allow us to expand into the front offices of retail banks."

"Philips' financial terminals business has been a strong presence in European banks, but DEC has had very little success breaking into that market," said Bill Coleman, an electronics analyst at James Capel and Co. in London. "Now that DEC is trying to migrate its customer base to Unix, it needed to find a solution very quickly, and part of that solution is Philips."

The deal also dovetails neatly with DEC's emerging European strategy of buying up second- and third-tier vendors to expand customer base and enter new markets, analysts said.

"In the German market, where Philips also has operations, DEC will now move up behind IBM and Siemens [Nixdorf Informationssysteme AG]," Mieritz said.

In 1989, DEC had only a 4% share of the 63,000 Unix-based multiuser systems in Europe, and Philips had 5%, Coleman noted. "Even together, they're a ways behind Siemens with its 18% share, but at least they're a strong second," he said.

DEC will offer jobs to 7,000 Philips employees in sales and customer support offices worldwide, despite the ongoing cuts in DEC's own work force.

European merger melee spins

Slew of new combinations poised to play in European market

ANALYSIS

BY NELL MARGOLIS
CW STAFF

The rapid approach of 1992, when Europe will officially unify into a single market, is converging with economic and industry trends to spur cross-border mergers, acquisitions and alliances at a dizzying pace.

Meanwhile, the same factors have turned Europe into a compelling shopping center for U.S. and Japanese companies.

Last Monday, Digital Equipment Corp. made its biggest European purchase to date: Dutch giant Philips Electronics N.V.'s troubled computer division (see story at left). On Tuesday, German auto maker Daimler-Benz AG positioned itself for a launch into the outsourcing arena with the purchase of a 34% stake in French technology firm Sogeti SA and an option to acquire computer services subsidiary Cap Gemini Sogeti SA.

On Wednesday, UK-based International Computers Ltd. (ICL), which was acquired by Japanese giant Fujitsu Ltd. last summer, announced a Pan-European computer services joint venture with Bell Atlantic Business Systems, Inc.

European computer firms are buying and allying "in anticipation of the opening of the unified European market in 1992," said Kenneth Goldstein, an economist at The Conference Board. "They're rushing to get in on the ground floor."

"It's very straightforward: Suddenly, 40% of the French market, for instance, translates into 5% of the European market, which is the relevant market," said Alec Ellison, a principal at Fort Lee, N.J.-based mergers and acquisitions investment banker Broadview Associates.

But if analysts and other industry observers agree that "Europe '92" is the central catalyst, they are also quick to point out that it is not the only force motivating combination in the European computer industry.

"European suppliers, particularly those who have enjoyed government-protected markets, are going to find life much harder in a free market and especially in one dominated by huge U.S. and Japanese firms," said Martyn Roetter, an international computer industry analyst at Cambridge, Mass.-based consultancy Arthur D. Little, Inc.

Backed by decades of experience marketing into the very kind of culturally distinct, economically united federation of states that Europe aims to become, U.S. firms have a strong but short-term advantage in the new Europe. "When you look at it," Roetter said, "the most 'European' companies in Europe right now are American."

In addition, the same unholy trinity that is sparking combinations in the U.S. — looming recession, booming competition and squeezed margins for vendors as users surge toward standards-based desktop computing — is doing no less in Europe.

Projected 1991 sales

(in millions)

Hewlett-Packard Co.	$1,927
DEC	[illegible]
Philips Electronics	[illegible]
IBM	$1349
Sun Microsystems, Inc.	$1,213
Siemens Nixdorf Informationssysteme AG	$410
Other	$4,159
[illegible]	[illegible]

Source: Computer Intelligence/Infocorp

"England has been in recession for quite some time," noted Richard Klugman, an analyst at Northern Business Information/Datapro. With the possible exception of Germany, he added, "the rest of the continent is shaky, too."

How fast and far the European slowdown is approaching and how deeply it will bite into the computer industry are matters of much speculation and scant agreement among experts.

Nevertheless, the economy is not likely to slow the consolidation. Purchasing and partnering around and into Europe "isn't an option — it's a necessity," said James Gallatin, an international lawyer at the firm of Gaston & Snow. "Your competitors are going to be there; you can't afford not to be."

DEC cuts

FROM PAGE 1

and inventory. There are currently 121,000 DEC employees.

DEC President Kenneth H. Olsen called the fourth-quarter results "exciting" but stressed that the firm will continue to downsize, cut costs and seek manufacturing efficiency.

The $1.1 billion restructuring charge sunk net income for the quarter into the red, showing an $871 million loss on the balance sheet. "Without the restructuring charge, we would have had net income of about $138 million in profit this past quarter," DEC spokesman Mark Steinkrauss said.

Analysts greeted the fourth-quarter results as they would a winning lottery ticket. "DEC took the brass ring this quarter," said Joseph Payne, an analyst at Alex. Brown & Sons, Inc. "They did much better than anybody expected and much better than anybody else in the industry."

Sales of workstations amounted to 60,000 units last year, DEC officials said. The Decstation line of reduced instruction set computing workstations accounted for 39% of all workstations sold, Steinkrauss said.

PC sales soared by 130%, accounting for 60,000 units sold. The combination of those sales with PC integration services accounted for $1.2 billion in annual revenue, analysts estimated.

Discounted VAX 6000s also helped to feed the bottom line this past quarter, while sales of the VAX 9000 mainframes remained slow. Mainframe revenue was roughly $114 million last quarter.

"DEC had an overall quite impressive quarter during a period of difficult economic conditions," said Barry Willman, an analyst at Sanford C. Bernstein & Co.

DEC's total operating revenue came to $13.9 billion for fiscal 1991, up 7% from last year's $12.9 billion. Yet the star performer in the fourth quarter was service and support revenue, which jumped 23% from $1.3 billion in last year's fourth quarter to $1.6 billion in this year's ending quarter.

"Sales were up 13%, but more importantly, the [profit] margins on sales were over 52% for that quarter," Payne said. "That means those are real sales, not just deep discounting to move a lot of units."

Some industry observers said they were convinced DEC's determination to become a software, services and systems integration vendor is paying off. "DEC has all the pieces in place to make a serious assault on IBM in the corporate market," Payne said. "We'll see DEC going nose to nose against IBM."

High gloss put on RS/6000 graphics

BY MARYFRAN JOHNSON
CW STAFF

NEW YORK — IBM polished the scientific and technical allure of its Unix-based RISC System/6000 workstations last week by adding higher performance color graphics and a new visualization system for highly complex research needs.

Also unveiled were an enhanced disk drive subsystem for high-end RS/6000s and price cuts of 38% to 42% on disk drives purchased with all new orders of RS/6000s.

IBM's Power Visualization System, *optimized for visualization work, will support the X Window System and OSF's Motif*

"IBM has finally gotten up to the capability Hewlett-Packard Co. has with its new 7000 [series of workstations]," said David Evancha, an analyst at Workgroup Technologies, Inc. in Hampton, N.H. "These additions bring IBM back into the race for leadership with the scientific and technical crowd."

However, Sun Microsystems, Inc. and HP still dominate the high-end scientific market, Evancha noted.

The three new RS/6000 graphics subsystems, the Power Gt4x, Power Gt4 and Power Gt3, are internally attached adapters connected to the workstation via Micro Channel Architecture slots. Priced from $3,500 to $17,000, they are designed for users of computer-aided design and manufacturing packages or those requiring a high degree of graphics functionality for solid surface modeling and rendering.

The Power Visualization System is a specially outfitted RS/6000, due to be available in November at prices ranging from $600,000 to $2 million. It will be optimized for visualization work with up to 32 parallel processors and will support the industry-standard X Window System and the Open Software Foundation's Motif interfaces.

IBM is also offering its own applications software for the visualization system. The AIX Visualization Data Explorer/6000, slated to be available in December at $5,900, allows users to perform advanced visualization on a stand-alone workstation.

The new 9333 High-Performance Disk Drive subsystem will boost maximum storage capacity from its present 2.5G bytes to 16.2G bytes, with four subsystems attached via a single adapter to RS/6000 500 series servers and workstations. On the top-end Powerserver 930, maximum storage can be increased from its present 11.9G bytes to 53.1G bytes. The drives are scheduled to be available in October, starting at $23,000.

Silicon Graphics joins low-cost 3-D fray

BY J. A. SAVAGE
CW STAFF

Joining in the increasingly heated competition for Unix-based desktop computers, Silicon Graphics, Inc. released a low-priced three-dimensional workstation last week.

The system is the second Advanced Computing Environment (ACE) workstation made available following Digital Equipment Corp.'s introduction of the Decstation 5000 Models 120 and 125.

Although Compaq Computer Corp. bought a 13% stake in Silicon Graphics in April, the new machine is not a hybrid or the result of any collaborative effort between the companies.

The workstation, called Iris Indigo, starts at $7,995 and includes a 16-bit sound system and 8-bit graphics. Based on Mips Computer Systems, Inc.'s R3000A CPU, Silicon Graphics claims the workstation runs 30 million instructions per second and 26 Specmarks (a measure of workstation performance from the System Performance Evaluation Cooperative).

Users accustomed to the high-quality graphics associated with Silicon Graphics may be disappointed, said David Wu, an analyst at S. G. Warburg & Co. in New York, but for a low-cost workstation, Wu said he was impressed. "There is some magic involved to get 8-bit graphics to look like 24-bit," he said.

Tom Lasinski, chief of numerical aerodynamic simulation at a National Aeronautics and Space Administration office in Moffett Field, Calif., said the graphics are not likely to be good enough for his exacting staff, which employs computational fluid dynamics to flight experimentation.

"I might use it as a replacement for my Mac for management duties." He said he cannot pull files from his staff's Silicon Graphics machines with his Apple Computer, Inc. Macintosh.

Silicon Graphics and DEC call their computers "ACE-compliant," but users should be wary of the semantic difference between ACE-compliant, ACE-compatible, advanced reduced instruction set computing (ARC)-compliant and ARC-compatible. Because ACE has not yet defined software compatibility, software that now runs on the DEC and Silicon Graphics machines will have to be recompiled once the operating system is available.

USERS ACCUSTOMED TO the high-quality graphics associated with Silicon Graphics may be disappointed.

Indigo users can cover their bets over the difference with $500. "For $500 or less, we will provide an ARC upgrade kit to bring Indigo up to ARC compliance," a Silicon Graphics spokeswoman said.

Bank

FROM PAGE 1

Before the Atlanta position, Trussell held the job of manager of strategic information services at Sovran in Nashville. After that slot was eliminated April 1, he escaped unemployment thanks to a boss who arranged a transfer.

"I don't have any fear so far; I would hope that the corporate philosophy stays the same as far as using information planners," said Trussell, whose original employer, Commerce Union Bank in Nashville, was acquired by Sovran. "You just have to keep doing your job and see what happens."

Increasingly, what happens are cutbacks. "A lot of banks have found they can do all the same things with a lot fewer people," said Ed Wisnewski, vice president of human resources at Bankamerica Corp.'s huge systems engineering department in Concord, Calif. "In earlier years, we got fat and happy and had the luxury of a lot of people. I don't think it will ever get that way again."

As a result, annual IS turnover at Bank of America has plunged from 20% a few years ago to 8% over the past four quarters, according to Wisnewski. "We're doing very little external hiring beyond the entry level," he said.

Still demand in LANs

Most bank IS managers and consultants say jobs are still there, but you have to be more technically skilled and work harder to land and keep them. As the technology changes and more applications move to smaller platforms, there is still demand for leading-edge talent in local-area networking and personal computer-based development.

But woe to the person who tries to get by with outmoded skills and a questionable work ethic. "In the 1970s, if you wanted lifelong security [in IS], you went to work for a bank; we were worse than the government," said Judge Fowler, senior vice president and director of systems development at First Union National Bank in Charlotte, N.C. "Now, the people that survive will have to be the best."

New Orleans-based M. Arthur Gillis, a bank IS consultant, said he has been getting frequent phone calls since the beginning of the year from out-of-work IS managers seeking job leads. "Anyone in the business today has to ask how he can make himself indispensable," said Gillis, president of Computer-Based Solutions, Inc. "A lot of people just fill the box on the organizational chart."

Sometimes, the industry consolidation can create unexpected opportunities. After Rocky Mount, N.C.-based banks Peoples Bank & Trust Co. and Planters National Bank & Trust merged to form Centura Banks, Inc. late last year, both systems development directors left. That left a serendipitous opening for Don Gladwell, who had spent 11 years in systems development at nearby Hardee's Food Systems but whose roots were in banking.

"When they merged, a lot of people left because they were uncertain what would happen," said Gladwell, who became Centura's senior vice president and director of applications development on March 1. "I happened to hit it at the right time."

Now, Gladwell is dealing with consolidation from the other side; Centura has recently acquired one savings and loan company and one bank and is considering buying several branches of another savings and loan company. "One of the biggest hurdles we have to overcome is to get people to stop worrying about who stays," Gladwell said. "As long as you do your job, you'll be here."

That is not always the case, however, as Sovran's Trussell learned in April. Working in IS for Sovran's marketing department in Nashville, he was the victim of a decision to standardize marketing practices across the merged operations of C&S and Sovran.

"I was kind of a misplaced person," Trussell said. "Fortunately, my boss decided that I needed a better fate than to just be let go. He found a position for me [in Atlanta] when there really wasn't one."

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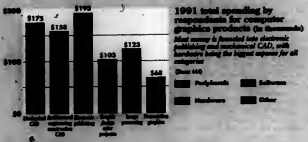
TRENDS

Computer graphics

Users continue to adopt new graphics hardware and software, with computer-aided design (CAD) and electronic publishing the key market drivers



1991 total spending by respondents for computer graphics products (in thousands)

Most money is funneled into electronic publishing and mechanical CAD, with hardware being the biggest expense for all categories

(Base: 444)

graphics

[illegible] currently house most [illegible]

Product brands	Presently using	Evaluating in 1991
Apple Computer, Inc. Macintosh	32%	27%
IBM Personal System/2	24%	17%
IBM & compatibles:		
80286	39%	4%
80386	68%	30%
I486	10%	51%
Other brands	1%	2%

Industry group	Percent of responding industries
Manufacturing	33%
Government	17%
Communications	13%
Business services	12%
Construction & related services	11%
Media & education	9%
Health	2%
Other	2%
Energy/Natural resources	1%

Who [illegible]

While [illegible] aerospace [illegible] telephone and [illegible] transportation and [illegible]

Source: Computer Graphics Research Institute, Sudbury, Mass.

CW Chart: Janell Genovese

NEXT WEEK

Metropolitan Life Insurance has big plans for downsizing from Bull minicomputers to Zenith PCs but has called a temporary halt to the project. Senior Vice President Dan Cavanagh is pausing to evaluate the many hidden issues of downsizing, such as remote network management, file integrity and security and data sharing. See Manager's Journal.

Where were you on Aug. 12, 1981, when IBM introduced its first PC? Does it seem like just yesterday? Since then, floppy disk capacities have increased by a factor of 16. PC clock speed is up by a factor of seven. 1981's best TV show, *Dallas*, is gone forever, and so is AT&T's monopoly. For more memories, see next week's Special Report.

INSIDE LINES

What's in a tele-word?

▶ The usually close-knit community of telecommuting advocates is having its first spat. Many telecommuting advocates were shocked to learn that Santa Monica, Calif.-based consultant Elisabeth Ghaffari recently obtained trademarks for the words "Telework" and "Telework Centers." Jack M. Nilles in Los Angeles, who originated the words telecommuting and telework back in 1973, told *Computerworld* he is planning a legal challenge to Ghaffari's trademarks. "Having coined the words, I take great umbrage at someone telling me I can't use them," Nilles said.

Mirror, mirror, on the wall . . .

▶ Imaging '91, scheduled for the Jacob K. Javits Convention Center in New York Sept. 11-13, has been postponed until next year, according to show organizers at Cahners Exposition Group. The first Cahners imaging conference, held last year at the Javits Center, attracted 65 exhibitors and some 10,000 attendees, according to a show official, who said a date for Imaging '92 has not been set.

Government assistance

▶ The heads of some Apple Macintosh user groups have received a letter from the FBI seeking their assistance in a child-kidnapping case. The FBI is querying the user group leaders to see if one of their members fits the description of a woman who is involved in a custody dispute. It's unclear why the FBI believes the fugitive is a Macintosh user.

OS/2 to get DB2 juice

▶ IBM will make DB2 — its new mainframe-based relational database — available as a back end to the OS/2 Extended Edition operating system without any changes to software in the near future, according to a user briefed by IBM. The firm's tweaking would affect the Remote Data Services portion of OS/2's Database Manager component, the user said.

Leave me off the party list

▶ Computer viruses that attack IBM PCs and compatibles are nearing a milestone of sorts. Within the next few months, the list of viruses will top 1,000, according to Klaus Brunnstein, a noted German computer virus expert. He has published a list of known malicious software for MS-DOS systems that includes 979 viruses and 19 trojans. In all, there are 998 pieces of "malware," Brunnstein said.

Logical deductions

▶ IBM 5394 clone maker Trisystems Corp. in Nashua, N.H., said last week it has discovered a hidden 17th logical unit embedded in the latest release of IBM's 5394 remote workstation controller software. Trisystems' Axel Tillman said he believes the LU was designed to eventually allow users to remotely distribute new versions of systems software to enterprisewide AS/400s and 5394s. An IBM AS/400 spokeswoman said she was unaware of the 17th LU.

Windows promises not broken — yet

▶ Some OS/2 2.0 developers recently received updates that enable the forthcoming release of OS/2 to run under Windows 3.0's Standard Mode. Previous versions ran only under Real Mode, which Microsoft plans to discontinue next year. Later this summer, IBM is also expected to deliver Windows drivers and Workplace Shell support. Although it is too early to determine the accuracy of reports circulating that IBM may not be able to provide all of the Windows support promised this past April under OS/2 2.0, it does appear that the operating system may not be available until November or December. While IBM has assiduously avoided any talk of delivery dates, company executives had previously said analysts' expectations of an October/November delivery were on target.

This week is absolutely the last opportunity to hook up with News Editor Pete Bartolik and collaborate on filling up this column with the best, brightest or funniest inside information. Catch him before he passes the baton; call (800) 343-6474, fax to (508) 875-8931 or hook up electronically on Compuserve, 76537,2413.

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